

Violence, Trauma, and Trauma Surgery

Ethical Issues, Interventions,
and Innovations

Mark Siegler
Selwyn O. Rogers Jr.
Editors



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Preface

On the South Side of Chicago, the absence of adult trauma services had been a highly controversial issue for decades. After The University of Chicago and the Michael Reese Hospital closed their adult trauma centers in the early 1990s, for the next 27 years there was no adult level 1 trauma center on the South Side, an area with a population of approximately 600,000. Over time, community activists advocated strongly for an adult trauma center, and after years of planning, The University of Chicago Medicine launched its new trauma center on the South Side in May 2018. In anticipation of the opening of the trauma center, in 2017 we (Drs. Rogers and Siegler) organized a lecture series on ethics, violence, trauma, and trauma surgery. This book brings together papers based on the lectures from this year-long series.

In 1948, the World Health Organization (WHO) defined health as a “complete state of physical, mental, and social well-being, and not merely the absence of disease or infirmity” (World Health Organization, 1948). Such an all-encompassing definition of health means that none of us is truly healthy; however, all of us aspire to achieve health in the face of the challenges of balancing physical, mental, and social well-being. When one considers the WHO’s definition of violence, we all must pause: the WHO defines violence as “the intentional use of physical force or power, threatened or actual, against oneself, another person, or against a group or community that either results in or has a high likelihood of resulting in injury, death, psychological harm, mal-development, or deprivation” (World Health Organization, 1996). Given this encompassing definition of violence, health is virtually impossible in the presence of violence. In this book, we examine the intersection of ethics, violence, trauma, and surgery. Various authors from a wide range of disciplines argue that intentional violence toward another person is complex. Causes of violence include poverty and lack of economic opportunity, and violence often occurs in impoverished and underserved communities. Many of the authors in this book use Chicago as a framework for their discussion, but there are similarities in most urban settings throughout the United States.

In Chicago, the impact of social determinants of health is most striking with regard to life expectancy. In the economically vibrant inner loop of Chicago, the

average life expectancy is 85 years of age (Krug, Dahlberg, Mercy, Zwi, & Lozano, 1996); in Washington Park on the South Side, a mere 7 miles away, the average life expectancy is 69 years of age. The distance between these two neighborhoods is covered in 10 minutes by train. The causes of this difference in life expectancy relate to race, class, resources, health insurance status, and geography. The impact of geography on health can be evaluated by various markers. For example, communities on the South and West Sides of Chicago have higher rates of homes with elevated lead levels, higher rates of unemployment, lower rates of high school graduation, and higher rates of asthma-related emergency department visits.

Correlating with higher rates of premature death, violence is also higher on the South Side of Chicago. Violence is complex and intersectional. When we focus on traumatic events, we focus on the immediate events, such as prehospital care and care in the emergency department, resuscitation bays, and operating rooms. Adverse childhood exposures to trauma increase one's likelihood of being a victim of trauma or a perpetrator of violence. The structure of our society also affects the likelihood of violence. Structural violence refers to ways in which our social arrangements—governments, economies, religions—put individuals and populations in harm's way (Galtung, 1969). Environmental factors, such as segregation, educational disparities, and lack of economic opportunities, may drive violent acts. The impact of racism and discrimination on individuals' lives affects their sense of self and social connections.

Instead of simply focusing on the traumatic violent event, we need to think simultaneously about how to approach violence and trauma. A traumatic violent incident may lead a person to develop posttraumatic stress disorder or retaliate against the person who harmed them. We need to approach trauma not as episodic events but from a public health perspective, incorporating prevention and recovery. The public health approach examines protective and risk factors. Protective factors may include social structures, such as family and church. Risk factors include poverty and unemployment. Victims of violence are a unique population of people whose risk for reinjury can be potentially lowered. Strong, Greene, and Smith (2017) examined long-term mortality over a 10-year period in patients who were hospitalized at a busy level 1 trauma center with gunshot wounds. The group found a higher survival rate in patients who were shot once and only once over that follow-up period than in those who were shot more than once. That survival difference is an opportunity for secondary prevention.

Trauma centers can do more than “just” provide trauma care. Hospital-based violence intervention programs can create “wraparound” services for victims of violence (Purtle et al., 2013). Intervention programs incorporate secondary prevention and recovery.

We have divided this book into three parts: Part I covers ethical issues related to violence; Part II, ethical issues in trauma and trauma surgery; and Part III, a variety of additional ethical concerns. Below we offer brief summaries of the chapters in each part to allow you to identify those most relevant to your interests and to give you an overview of the scope and depth of the book's content.

Part I. Ethical Issues Related to Violence

We open this book with six chapters that examine ethical issues related to violence. Each of these chapters discusses a different but intersecting aspect of how violence challenges ethical standards in medicine and health.

The first chapter is by a team from San Francisco, Rochelle Dicker and Catherine Julliard. It discusses the important issue of Wraparound Programs, i.e., hospital programs designed to reduce violence and recidivism among those who are victims of violence. The authors write that violence is the second most common cause of death in youths aged 15–24 years. They further note that many of the risk factors for further violence relate to social determinants of health. These risk factors include male gender, unstable family structure, housing instability, low socio-economic and educational status, unemployment, previous incarceration, and substance abuse. Further, those who were previously injured by violence are more than twice as likely to die from violence if reinjured (Griffin et al., 2014). The principal approach to this crisis is addressed in hospital-based violence intervention programs. These approaches are discussed in detail in this chapter and include educating victims in the hospital setting after their injury, reducing risk by having case managers intervene in the victims' needs, and addressing victims' mental health issues. This approach has been endorsed by the American College of Surgeons Committee on Trauma (Cribari, Smith, & Rotondo, 2014) and has expanded from its original site in San Francisco to many other cities in the United States.

The second chapter, authored by Pastor Chris Harris, Sr., is entitled "(TURN) The Urban Resilience Network." Pastor Harris developed a program called "Praying around the Schools," which entails students, church members, and others praying for an hour at different schools. Pastor Harris also established a local, Bronzeville, nonprofit arm for his church, "Bright Star Community Outreach" (BSCO). BSCO now serves more than 5000 people in the community and partners with more than 50 organizations to help Bronzeville reduce violence. In his chapter, Pastor Harris also discusses the specific phases of the TURN program.

The third chapter, by Jon Lowenstein and Marisa Dharmawardene, is called "A Violet Thread: How Violence Cuts Across the Generations on Chicago's South Side" and provides moving photographs and first-person oral histories from African American residents of Chicago's South Side. These photographs and histories describe the impact of violence on South Side community members and the intersection of violence with other social determinants of health. The chapter also highlights how community residents remain resilient in the face of continuing local violence while retaining allegiance to their South Side community.

The fourth chapter, by Tonie Sadler and Harold Pollack, entitled "Engaging People in Behavioral Crisis," explores the challenges faced by those who respond first to behavioral crises. The nature and origin of such behavioral crises vary widely and are related to mental illness, alcohol intoxication, and intellectual and developmental disabilities, to name a few. The authors describe how crisis intervention teams can effectively and safely serve individuals who face such crises. They then

discuss their work in Chicago and describe the organizational and policy obstacles that limit the effectiveness of crises intervention teams.

In the fifth chapter, authors Gary Slutkin and Charles Ransford examine the topic of violence as a contagious disease. They suggest that violence is a health issue that is the expected result of exposure, contagion, and trauma and propose an approach to reduce violence, “The Cure Violence Health Model.” This approach uses epidemic control methods to detect and disrupt violent events, to change behavior among the highest risk persons and groups, and eventually to shift both group and community mores. By 2018, this model had been adopted by 100 communities in 16 countries, and the results have been promising. Among the communities that have used the model, the authors name Chicago, New York City, Baltimore, Honduras, Trinidad, and Mexico.

The final chapter in Part I, written by Sara Scarlett and Elizabeth B. Dreesen, is entitled “Workplace Violence in Trauma Care.” The authors, both practicing surgeons, examine the impact of violence on US health care workers, especially those who work in trauma surgery. They discuss some of the ethical issues associated with workplace violence in trauma surgery and offer new approaches by which trauma surgeons can respond constructively to the problems of violence in their care setting.

Part II. Ethical Issues Related to Trauma and Trauma Surgery

Part II of the book includes nine chapters that address various aspects of ethical issues related to trauma and trauma surgery.

Chapter 7 by Marie Crandall is entitled “Geographic Information System in Trauma Research.” The study of geographic information systems identifies areas at high risk for different forms of trauma, including pedestrian injuries, burns, falls, and penetrating trauma. This chapter specifically examines mortality from gunshot wounds in Chicago and the location and evolution of trauma care systems in Chicago.

The subsequent chapter by Anne C. Mosenthal and Franchesca J. Hwang is entitled “Palliative Care in Trauma: Violence and the Ethics of Care.” This innovative chapter explores the ethics of palliative care for those injured by violence and argues that death and disability from violent injury are major public health problems that disproportionately affect young, previously healthy individuals. Little attention has been paid to providing this young population with palliative and end-of-life care. Questions about how and when to provide such care raise deep ethical issues.

Chapter 9, by Jeffrey J. Skubic and Zara Cooper, entitled “Geriatric Trauma Care,” discusses the issue of geriatric trauma care. As the US geriatric population has been growing, there has been an increase in injuries such as traumatic brain injuries, falls resulting in hip and rib fractures, and motor vehicle accidents. This creative chapter examines ethical issues related to providing trauma care for injured

older patients, a group that has been shown to have higher in-hospital mortality after trauma than younger patients. Even when elderly trauma victims survive, many experience functional declines that have a negative impact on both their ability to live independently and their quality of life.

Chapter 10, by Kimberly Joseph and Carol Reese, is entitled “Primum Non Nocere: When Is It Our Moral Duty to Do More for Our Trauma Patients in Need?” The authors emphasize that patients who have been violently injured require more positive support from caregivers than merely “doing no harm.” Rather, our moral responsibilities should include efforts to care, to cure, to reduce pain and suffering, and to heal.

Chapter 11 is entitled “Girls and Trauma: Performing Socio-Surgery Through a Gender-Responsive Lens.” In this chapter, Sherida V. Morrison and T-awannda Piper present data highlighting that adolescent girls are more prone to trauma than boys and that the impact of trauma on adolescent girls is both physiological and psychological. The authors propose a gender-responsive approach that involves specialized practitioners and will reduce the lasting effects of trauma and, in the process, “redirect the course” of traumatized adolescent girls.

Chapter 12, written by the Chicago critical care doctor Cory Franklin, is entitled “An Internist’s View of Trauma Units: From Ancient Warfare to Modern Assistive Technology.” Franklin traces the evolution of the trauma unit, including the history of the first comprehensive civilian trauma unit in the United States, a unit that was started at the Cook County Hospital in Chicago. Trauma units were developed initially to improve battlefield medical care during warfare. Today’s civilian trauma units use a multifaceted team approach that includes surgical and medical specialists, nurses, and therapists, all of whom work together. A comprehensive approach to trauma, from the initial point of triage and resuscitation to the later process of caring for the patient’s long-term needs, including the problem of posttraumatic stress disorder, makes the trauma unit a vital community resource.

Chapter 13 is by Danby Kang and Mamta Swaroop and is entitled “Empowerment: The Ethical Dilemma.” The key to developing successful trauma systems in low- and middle-income countries is empowering a community within the country. Efforts should be directed at educational and policy developments that help to mobilize resources from the public and private sectors.

Chapter 14, by S. Morad Hameed, Keanna Knebel, and Selwyn O. Rogers, is entitled “The Future of Injury Control Is Precise: Ethical Issues in Violence, Trauma, and Trauma Surgery.” During the past five decades, successful trauma systems have decreased trauma mortality. The central question addressed in this chapter is whether the “precision medicine movement” will further improve trauma systems or whether, by individualizing care, it will divert support from population-based approaches to health, as currently exemplified by trauma systems. Regarding this question, the authors conclude that by balancing ethical considerations with the capabilities of “precision medicine” trauma, surgeons have the opportunity to lead a new movement called “precision injury control,” which will integrate trauma systems and precision medicine.

Chapter 15, by Maya A. Babu, is entitled “Ethical Issues in Neurotrauma.” Babu notes that neurotraumatic injuries involve the brain, spinal cord, and peripheral nerves. She emphasizes that treating a patient with a traumatic brain injury raises many ethical issues, including informed consent, goals of care, and discussions of end-of-life measures with the patient or the patient’s surrogate. The chapter also discusses ethical issues related to innovative treatments, such as deep-brain stimulation and other new invasive approaches.

Part III. Additional Concerns Relating to Violence and Trauma

The chapters in the final section of the book describe a series of issues relating to violence and trauma, including surgical procedures, psychological distress, and geographic disparities in access to trauma care.

Chapter 16, by Colin Murphy, John Holcomb, and John R. Hess, is entitled “The Evolution of Transfusion Therapy in Trauma.” Transfusion has been a critical factor in the development of trauma care since the first blood bank was established 100 years ago. Bleeding is the most common cause of early trauma death, and rapid access to a full range of blood products saves lives. The initial treatment of massive hemorrhage with blood products tries simultaneously to replace lost blood volume, increase oxygen carrying capacity and establish hemostatic activity.

Chapter 17, by Matthew J. Bradley and Thomas M. Scalea, is called “Diagnosis and Management of Penetrating Thoracic Vascular Injury.” Although penetrating vascular injuries account for only a small portion of a thoracic surgeon’s training, such injuries are challenging and can be lethal. It is therefore imperative that the trauma surgeon knows how to diagnose and treat them. The hemodynamically compromised and hypertensive patient requires emergency exploration.

Chapter 18, “Healing Hurt People – Chicago: Supporting Trauma Recovery in Patients Injured by Violence,” is authored by Bradley C. Stolbach and Carol Reese. Trauma centers that care for patients with gunshot wounds and often violent injuries have both an opportunity and an ethical obligation to intervene in the cycle of violence in which many patients are caught. “Healing Hurt People” is a hospital-based violence intervention model that aims to address unresolved psychological trauma as a key driver of risk for violent injury. The measure works to interrupt the cycle of violence by addressing and working to heal trauma victims.

Chapter 19, by Nidhi Rhea Udyavar, Ali Salim, and Adil H. Haider, is entitled “Clinician Unconscious Bias and Its Impact on Trauma Patients.” This chapter describes how the unique features of trauma care, such as the diverse patient population and the difficulty of caring for acutely and critically ill patients, can predispose to the formation of unconscious biases. It proposes education strategies to reduce surgeons’ unconscious biases and thus better enable them to care for injured patients from all racial/ethnic and social backgrounds.

Chapter 20, by L.D. Britt, is entitled “The Establishment and Education of Acute Care Surgery.” Acute care surgery embodies three specialty components: trauma

surgery, emergency general surgery, and surgical critical care. In each of these, early diagnosis and intervention is the cornerstone of optimal management. Establishing acute care surgery as a defined specialty is necessary to achieve optimal care and inclusion for injured and critically ill surgical patients.

Chapter 21, written by Mary K. Bryant, Sara Scarlet, and Elizabeth B. Dreesen, is entitled “Trauma Care for Justice-Involved Persons.” The United States has a larger incarcerated population than any other country in the world. In recent years, investigations have explained the health needs of this population. While there is a paucity of data about the surgical and trauma needs among the incarcerated, it is generally agreed that the prevalence of traumatic injury is high and, further, that experiencing trauma may increase the lifetime risk of incarceration.

Conclusion

Drawing from a diverse collection of authors, this book examines the intersection of ethics, violence, trauma, and trauma surgery from various perspectives. The past five decades have witnessed an increase of trauma systems. Despite advances in trauma care and injury prevention, however, injuries still claim the lives of 5.1 million people each year (Norton & Kobusingye, 2013), destroy human potential more than any other health issue and negatively impact the physical and psychological well-being of individuals and communities. Disparities in injury risk and access to high-quality trauma care have persisted everywhere and are rooted in structural violence and discrimination in the face of the trauma system’s ideal that every critically injured patient has the right to the best care, regardless of socioeconomic status.

Geographic disparities in trauma care have been well documented, with up to 46.7 million Americans living in so-called trauma deserts, where the nearest level I or II trauma center is over an hour away (Branas et al., 2005). This burden falls overwhelmingly on rural communities (Hsia R & Shen Y-C, 2011; Hsia RY-J & Shen Y-C, 2011; Gomez et al. 2010), but disparities also exist in urban communities: poor, uninsured minorities are more likely to live in trauma deserts and experience trauma center closures in their communities (Crandall et al. 2013; Hsia R & Shen Y-C, 2011; Hsia RY-J & Shen Y-C, 2011; Hsia, Srebotnjak, Kanzaria, McCulloch, & Auerbach, 2012; Shen, Hsia, & Kuzma, 2009; Wandling, Behrens, Hsia, & Crandall, 2016). Thus, the inequitable distribution of trauma centers, whether intentional or not, structurally disadvantages certain groups of people and puts them at greater risk of harm. The persistent burden of injury irrevocably harms families, communities, and nations. The University of Chicago Medical Center on the South Side of Chicago is the latest trauma center to meet the needs of a relative trauma desert, and we are happy to celebrate this milestone by bringing you our distinguished panel of authors’ perspectives on these complex and destabilizing issues.

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Part I
Ethical Issues Related to Violence

Chapter 1

Hospital-Based Interventions to Reduce Violence and Recidivism: Wraparound Programs



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Public Health Approach to Injury and Violence

In the United States, homicide is the second most common cause of death among youth aged 15–24 years (Center for Disease Control, 2016). Among African American youth, homicide is the leading cause of death (Center for Disease Control, 2016). For every person killed, there are an estimated 42 nonfatal injuries, each of which carries an associated burden of disease in terms of disability, economic impact, health-care utilization, and long-term societal consequences for the communities most affected (Center for Disease Control, 2014).

Historically, injuries were seen as “accidents” that could not be predicted or effectively prevented. Over the last 100 years, however, a succession of conceptual revelations by vanguards such as Hugh DeHaven, John E. Gordon, and William Haddon has resulted in a fundamental shift in how we view violent injuries (Dicker & Juillard, 2017). Violent injuries do not affect communities equally. Communities of color, particularly African American and Latino/Latina communities, are disproportionately affected, a disparity that is additionally compounded by geographic and economic inequality (Beard et al., 2017; Walker, McLone, Mason, & Sheehan, 2016; Wintemute, 2015). In studying any disease, recognition of increased risk for certain populations provides an opportunity for identification of prevention targets and treatment efforts. Injury, and in particular violent injury, can be approached in a

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similar manner to any other public health problem by applying known frameworks that help identify these opportunities.

The public health framework for disease control focuses on monitoring a condition, identifying modifiable risk factors associated with developing that condition, developing interventions to mitigate those risk factors, and then evaluating the impact of these interventions after they are implemented. Gordon (1949) demonstrated that violence behaves like other diseases described by the epidemiologic framework of host, vector, and environment factors. Haddon (1980) built on this development by creating a matrix that allows us to objectively deconstruct an injury event and identify moments that provide opportunities for intervention (Table 1.1).

Table 1.1 Haddon's matrix applied to gun violence as a public health problem

| | Human factors | Agent factors | Environmental factors |
|------------|--|--|---|
| Pre-event | Mandated gun safety training | Gun storage education | "Common sense" handgun regulation |
| | Physician implementation of firearm safety questions | Fingerprint/other recognition so individual guns can only be operated by specific people | Targeted community-level poverty reduction strategies |
| | Identification of high-risk individuals | | Address socioeconomic and other social determinants of health |
| | Individual risk reduction through improved employment, education retention, and housing | | |
| | Mental health resource referrals | | |
| Event | Community training on identification of high-risk scenarios and taking cover/sheltering to minimize exposure to injury | Reduce firearm lethality by limiting caliber, velocity, and range capabilities | Shot detectors to notify enforcement and health-care personnel of a potential gun violence victim |
| Post-event | "Stop the Bleed" campaigns or other layperson prehospital trauma training for high-risk communities | Limit gun capacity to re-fire rapidly | Locate ambulance deployment centers to facilitate rapid prehospital trauma response times |
| | | | Training of prehospital medical personnel to specifically treat gunshot wounds |
| | | | Trauma center proximity in high-risk areas |

Environmental factors can include social, political, and cultural factors. Although some versions of Haddon's matrix include this as a fourth factor category, we have included it here under "Environmental Factors"

Another evolution of the Haddon's matrix includes a "fourth dimension" that evaluates value criteria (feasibility, cost, effectiveness, etc.) for each proposed intervention to aid decision-making

The use of such a matrix facilitates the breakdown of assumptions that may prevent us from identifying risk and protective factors that are potentially modifiable through a public health intervention.

A multitude of factors have been described that influence increased risk for violent injury. These factors include male gender, unstable family structure, housing instability, low socioeconomic and education status, unemployment, previous incarceration, and substance abuse (Richardson, St Vil, Sharpe, Wagner, & Cooper, 2016). One of the strongest predictors of future violent injury is previous violent injury (Cheng et al., 2003; McCoy, Como, Greene, Laskey, & Claridge, 2013). Additionally, those who have been injured previously are more than twice as likely to die from violence if reinjured (Griffin et al., 2014). Identification of a high-risk group with potentially modifiable risk factors provides a compelling argument for a public health approach to violent injury control. It is upon this premise that hospital-based violence intervention programs (HVIPs) were built. Because hospital trauma centers are the primary treatment destination for violently injured individuals, trauma centers have immediate access to one of the highest-risk groups for future injury, providing a golden opportunity for prevention and intervention efforts. Recognition of this opportunity has led to the creation over the last 15 years of numerous HVIPs, which now number over 30 nationally and are growing in number. These programs have demonstrated that successful application of injury prevention principles can stop the “revolving door” of violence and reduce the recurrence of violent injury in high-risk populations through risk factor modification.

Application of Injury Prevention Principles to Violence Prevention

There exists a framework by which we can envision the factors that affect health. The framework takes the shape of a pyramid, with the bottom of the pyramid representing the factors that have the greatest impact on health and the top those that have the least impact. At the very bottom of this pyramid, the foundation of health or, alternatively, the foundation of an unwell state is where we find socioeconomic factors. Communities that suffer from negative factors often are struggling with poverty, food deserts, lack of employment opportunities, poor education, substandard housing, neighborhoods that lack green space, poor air quality, health-care inequities, and limited transportation options. The communities most affected by these substandard conditions often experience poor health and chronic disease across the life span. Each generation develops chronic diseases in different age groups: high infant mortality, asthma, violence, obesity, poorly controlled diabetes, early pulmonary and cardiac disease, and late-presentation cancers. It is when we see communities in which each generation suffers in some way from health inequity that we should acknowledge that this amounts to an injustice in health and, relatedly, wealth. An unhealthy society is unable to maintain gainful employment or focus on educational studies. Failure to address this inequity is perhaps a profound example of structural racism.

In this framework of generational chronic disease, violence is at the core, with disproportionate suffering among young people who are just becoming economically independent. For individuals and the communities in which they reside, violence is recurrent and thereby can be considered as a chronic public health crisis.

The factors at the bottom of the pyramid, however, *can* be addressed and *are* modifiable. This premise serves as the underlying principle of hospital-based violence intervention programs (HVIPs). Individuals who are victims of interpersonal violence enter trauma centers with several modifiable risk factors that are associated with sustaining a violent injury. The hospital setting offers a “teachable moment” for these individuals because immediately after injury they are particularly and acutely keen to make changes to ensure their future safety. HVIPs seize this “teachable moment” by providing individuals with culturally competent Case Managers, who are poised to provide long-term case management and mentorship. In addition, Case Managers or Intervention Specialists assess needs and shepherd participants through risk reduction resources found through government bodies and partnering community-based organizations (CBOs). The hypothesis of this approach rests on the notion that reducing the risks associated with violent injury, in conjunction with providing intensive case management and addressing mental health issues, can reduce the risk of violent injury recidivism.

HVIPs also rely upon a trauma-informed care approach. This type of approach acknowledges that many victims of violent injury have been subjected to traumatizing events often for a lifetime, which can lead to complex posttraumatic stress disorder, anxiety, depression, substance abuse, and other serious mental health challenges. HVIPs often incorporate mental health care into their programs’ core offerings or have close partnerships with mental health services, such as Trauma Recovery Centers. Addressing mental health issues is often fundamental for an individual to begin the path to risk reduction in other areas, such as employment.

This public health approach in HVIPs has been endorsed by the American College of Surgeons Committee on Trauma as a best practices model for violence prevention. Measures of success of violence prevention programs that lead to this endorsement frequently rest on the evaluation of a program’s ability to recruit and sustain participants, catalogue risks associated with violent injury, address those risks, and ultimately reduce recidivism. A number of programs have demonstrated success, five of which used randomized controlled trials (RCTs) as their methodology. The two longest running RCTs demonstrated a clear reduction in either recidivism or overall hospital visits (Cooper, Eslinger, & Stolley, 2006).

Many programs have not used RCTs to evaluate success because a lack of equipoise perceived by both communities and occasionally by institutional review boards has prevented the use of randomization. The sentiment stems from the sense that providing these types of grassroots services will likely not cause harm and may indeed be helpful. Alternatively, not providing the option to participate in services has been perceived as a potential inequity. This held true for the San Francisco Wraparound Project. When the program was in its formative stages, community members involved in hiring the first Case Manager made a clear request to offer the brand-new services to all at-risk youth and young adults.

Several non-randomized program evaluations have demonstrated a significant reduction in violent injury recidivism and a reduction of the risks associated with violence (Cheng et al., 2008; Cooper et al., 2006; Juillard et al., 2016). There have also been data to support the cost-effectiveness of these programs (Juillard et al., 2015). There is an ongoing study evaluating the intermediate outcomes of six HVIPs from different regions of the country. This observational study aims to compare risk reduction rates among US regions, genders, ethnicities, and age groups. In the future, programs will be evaluating important qualitative measures, such as clients' perceived value of the programs and improvement in resiliency after program participation.

The October 2017 *Bulletin* of the American College of Surgeons features "Violence intervention programs: A primer for developing a comprehensive program for trauma centers" (Dicker et al., 2017). The *Primer* describes a step-by-step approach to create and sustain an HVIP and addresses critical components, such as engagement in city, community, and hospital stakeholders; the importance of early evaluation; potential funding sources; and recruitment of Case Managers/Intervention Specialists. The Committee on Trauma's website highlights an expanded version of this *Primer* and provides a template PowerPoint presentation on important features in building a program that can be used with a broad audience of stakeholders.

The National Network of Hospital-Based Violence Intervention Programs (NNHVIP) represents over 30 programs that are similar in approach and mission in hospital-based violence intervention. NNHVIP offers consulting services to fledgling programs and provides opportunities for the member programs to grow through working group participation. NNHVIP also holds a national conference with Cure Violence. See "Future Directions" below for more information.

There are ethical considerations when starting and sustaining a violence intervention program. The first was touched on earlier in the discussion of inequalities and structural racism (see above section "[Application of Injury Prevention Principles to Violence Prevention](#)"). Even in some of the most "progressive" and sympathetic trauma centers, there exists an underlying current among many providers that violence is somehow inevitable and expected. This cultural *moré* requires considerable effort in educating people on the notion of modifiable risk factors and social determinants of health. It can take significant time to change perceptions, but providing examples of best practices can set a trauma center on the road to giving violence intervention a chance to break down these preexisting beliefs. It is imperative that these educational sessions be led by the communities most affected by violence. Audiences include health-care providers, hospital administrations, city officials, and students.

It is also important to begin to break down inherent mistrust toward the health-care system that may exist in the community. This mistrust is sometimes deeply rooted. Program officials should visit community centers and CBOs to express the premise of the program, i.e., risk reduction through culturally competent case management. Communities affected by violence must have a voice in the formation of these programs because they are the people ultimately affected by the outcomes. These community partnerships are vital to participants' success in HVIPs.

A lack of randomization as a result of the principle of equipoise has been discussed above. Inequity already runs deep in health care, affecting vulnerable populations. This inequity includes access to trauma care in some rural and urban areas. Quality aftercare, including acute rehabilitation, is also not readily available to our most vulnerable populations. HVIPs focus largely on the period of aftercare. In the absence of evidence that these programs cause harm, randomization will remain difficult to justify in many settings.

The backbone of HVIPs is long-term, culturally competent case management. The bond that forms between the participant and the Case Manager/Intervention Specialist is often a life-altering relationship for the participant. Privacy and confidentiality are at the heart of this trusted relationship and must be maintained. The National Institutes of Health offers a Certificate of Confidentiality that protects programs and the evaluation process from subpoena. Many programs take advantage of this very useful protection. Of course, providers are still bound as obligate reporters for homicidal or self-harm declarations.

Finally, programs are frequently and fortunately part of a larger effort toward violence prevention in a city or community. Law enforcement is often part of that comprehensive effort. Walking this line of having a relationship with law enforcement but maintaining client trust is challenging, but it is manageable through good communication about boundaries. HVIPs very commonly participate in these broader efforts but are still held to the principles of privacy and confidentiality and to the Health Insurance Portability and Accountability Act (HIPAA) of 1996 when engaging with law enforcement or other community groups. See “Navigating Community Relationships While Maintaining Trust” below for more information.

The basis for violence as a public health issue began to gain recognition after some early and groundbreaking work by Dr. Deborah Prothrow-Stith, who recognized several decades ago that violence, like other health issues, had modifiable risk factors. Subsequently, Surgeon General C. Everett Koop and the Department of Health and Human Services published “Youth Violence: A Report of the Surgeon General” in 2001 (United States, 2001). More than 30 years ago, there was evidence that a public health approach was more effective and safer than approaches in the same genre as a “Scared Straight” type of program. Data in the literature have continued to question the value of programs that use boot camp methodologies. There has been significant concern as to the potential harm that these programs can create by recreating the earlier trauma and triggering posttraumatic stress or other consequences (Purtle, Cheney, Wiebe, & Dicker, 2015).

Navigating Community Relationships While Maintaining Trust

One of the fundamental characteristics of any successful HVIP is the strength of its connection to community stakeholders. Partners may include CBOs, institutional partners in the health care and education sectors, and governmental partners. Because working with HVIP clients commonly involves overlap with the criminal

justice system, cultivating a strong relationship with this governmental entity is critical for client advocacy. At the same time, this relationship must be carefully navigated to protect client information and community trust. Managing a solid relationship with key personnel from the criminal justice system while maintaining the trust of clients and the communities served by the HVIP can not only represent an ethical challenge but also put frontline workers at risk if not properly handled.

One essential component of establishing boundaries is creating a memorandum of understanding (MOU) with criminal justice groups that delineates the limits of communication. As hospital-based frontline workers, HVIP Case Managers and Intervention Specialists are often responsible for adhering to patient privacy standards defined by HIPAA. As such, partners (including criminal justice partners) need to understand and agree to work with HVIPs under the condition that personal, identifying, and sensitive client data may not be shared by HVIP workers with any agent in the criminal justice system. This condition should be explicitly stated in the MOU and agreed to by all involved parties. If the client and Case Manager feel that information may potentially benefit the client in terms of court advocacy, sentencing, or other criminal justice-related activities, many HVIPs have an optional written release of information that allows specific information to be shared at the client's request. Again, this type of agreement needs to be at the client's request and under his or her ultimate control; for example, the client must be able to terminate the agreement at any time.

The potential consequences of mishandling these relationships can be severe. HVIPs are only as effective as the trust put in them by the communities they serve. Culturally competent case management requires a deep understanding of the community and reliable information given by the client to facilitate personalized and successful peer mentoring. If clients believe that their Case Manager or any member of the HVIP team may share sensitive information, not only will that ruin the client-Case Manager relationship, but years of established community trust could rapidly unravel, yielding the HVIP ineffective (at best) or a community anathema (at worst). Additionally, Case Managers or Intervention Specialists associated with any report (false or true) of sharing protected client information with the criminal justice system may find themselves at increased personal risk during their work in the community. Selecting Case Managers who already have political and social clout in their communities mitigates some of this risk, but privacy must still be protected.

Building Relationships Among Community-Based Organizations

One of the fundamental principles in applying the Wraparound model to violence intervention and prevention is that intensive, individualized case management connects clients to services that are embedded in their communities (Winters & Metz, 2009). Ideally, relationships should be initiated with CBOs even before the formation and launch of the HVIP. One successful approach has been to have the founding leadership of the HVIP reach out to CBOs through meetings, informational

interviews, and community gatherings to gather perceptions and opinions on the primary needs of violently injured people in marginalized populations. Developing these personal relationships prior to the formal launch of the HVIP allows CBOs to influence the HVIP's development from inception. Some HVIPs have even arranged for a CBO-led panel to interview candidates and participate in the selection of the first HVIP Case Managers. This approach ensures that the HVIP Case Managers are respected and accepted by a diverse stakeholder group, which will ultimately facilitate their ability to connect HVIP clients to services in an efficient and collaborative manner. This approach, if carefully done, can also increase the likelihood that the HVIP Case Managers are individuals who are not overly aligned with certain geographic parts of the city or certain communities within the same city. HVIP Case Managers need to have the ability to cross over certain community divisions that may historically exist and be able to access and support all populations who are at high risk for violent injury.

Once the HVIP is established, maintaining these carefully cultivated relationships with CBOs is essential. Connections should be reenforced and strengthened through regular meetings between HVIP Case Managers and leadership. As with any complex human system, misunderstandings and communication breakdowns can and will occur; having a system in place to mitigate or rapidly address any issues is crucial. As the HVIP grows and accumulates more staff, the number of relationships increases, simultaneously increasing the potential for miscommunication. One method of streamlining communication with community partners is to designate certain Case Managers as the "lead" with specific CBOs, thus allowing the channeling of information through a consistent person. This approach has been helpful in reducing duplicative or conflicting messages.

Future Directions

National Network for Hospital-Based Violence Intervention Programs

As HVIPs steadily increased in number over the past 10–15 years, some of the more mature programs recognized a need for increased collaboration and coordination, both to share best practices and to improve existing organizations, as well as to provide a guiding resource for nascent HVIPs. In 2009, the nine programs existing nationally that had been operational for more than 1 year convened to facilitate the development of a network, the National Network of Hospital-based Violence Intervention Programs (NNHVIP). This initial meeting allowed the most established programs in the country to codify the key components of an HVIP to support existing and emerging programs (Martin-Maller & Becker, 2009). Since its inception, the NNHVIP has held annual national meetings (The Healing Justice Alliance)

featuring presentations by Case Managers, program leadership, program evaluators, and keynote speakers and addresses by former and current clients. Additionally, the NNHVIP has several working groups to guide high-level advances in specific aspects of HVIPs, such as workforce development, policy, and research and evaluation. Current priorities include standardizing data collection practices to facilitate rigorous program evaluation, establishing credentials for violence intervention professionals, advocating for payment or reimbursement for HVIP case management services, and promoting trauma-informed mental health services for victims of violence.

NNHVIP has forged a relationship with the American College of Surgeons Committee on Trauma. The MOU allows for the NNHVIP to offer consulting and mentoring services, among other items, to fledgling programs. This MOU was established around the time that the Committee on Trauma published its abovementioned *Primer* in the October 2017 *Bulletin* of the American College of Surgeons. The *Primer* aimed to provide immediate assistance to interested trauma centers. Other efforts between the two groups include research endeavors and advocacy.

The Committee on Trauma's Injury Prevention and Control Committee has a working group dedicated to hospital-based violence intervention. This group developed the abovementioned *Primer* and is currently working on slide sets for a speakers bureau and setting a research agenda (Dicker et al., 2017). In addition, several working group members are part of the committee working on revising the Prevention chapter in the *Resources for the Optimal Care of the Injured Patient* (Rotondo, Cribari, & Smith, 2014). This book provides guidelines by which trauma centers are verified by the American College of Surgeons. Revisions of the Prevention chapter may reflect the endorsement of the Committee on Trauma regarding the current best practices model for HVIPs that was highlighted in the October 2017 *Bulletin* of the American College of Surgeons.

Strengthening Program Evaluation Practices

There is mounting evidence for the effectiveness and cost-effectiveness of HVIPs in terms of reducing reinjury, aggression, arrests, and convictions for violent crime and saving costs associated with hospitalizations due to violent injury (Cheng et al., 2008; Cooper et al., 2006; Juillard et al., 2015, 2016). Despite this, there is still a need for further demonstration of effectiveness and individual program evaluation.

Traditionally, the gold standard study design used to evaluate a health intervention is the RCT. While there are a few examples of the use of an RCT design to evaluate an HVIP, an RCT may not be feasible in many settings, as explained above (see section “[Application of Injury Prevention Principles to Violence Prevention](#)” above) (Cheng et al., 2008; Cooper et al., 2006). For example, if a program has the bandwidth to consider all eligible persons for enrolment in HVIP services, restricting

these services to only part of the eligible population may violate the principle of equipoise, as explained above. For this reason, other evaluative models need also to be considered, such as counterfactual models, retrospective case-control studies, pre-/post-implementation studies, and quasi-experimental study designs, such as a stepped-wedge approach, which can be used to control for bias.

Another challenge inherent in designing program evaluation studies is the lack of standardized screening processes and the associated ability to control for case mix. Often, HVIPs have only limited resources and therefore restrict inclusion criteria to clients who the Case Managers consider to be “high risk.” The lack of a standardized approach to screening to date has left screening largely to the discretion of the program and sometimes the Case Manager. Correspondingly, if researchers evaluate the reinjury rates of a program that focuses on high-risk clients and compares the rates with those in non-high-risk clients not enrolled in the program, they may find that the enrolled cohort has a higher reinjury rate (despite excellent HVIP support). However, this finding may simply be due to higher risk in the study group than in the clients who were not offered services. This selection bias is difficult to control for without a formalized approach to risk assessment. Current opportunities for strengthening program evaluation include the development of tools to facilitate initial screening for risk level that may ultimately provide a measure of risk that can be applied to control for case mix through the evaluation process.

While reinjury has historically been the primary outcome most valued in program assessment, this metric has several limitations. Simply waiting for a short period of time for a reinjury to occur may result in underreporting and under-capture of injury events because reinjury may not manifest for several years. Consequently, programs may have to wait years to collect enough data to allow for adequate evaluation. Development of a standard model for the theory of change linking HVIP services to reduction in reinjury may provide specific process measures that can serve as shorter-term surrogates for interim program evaluation.

Additionally, every HVIP has clients who have succeeded on many levels, only to have an unfortunate event happen that leads to reinjury, despite aggressive risk factor modification and marked improvement in quality of life. There are major gains to be made in terms of educational achievement, job readiness, community health, reduction in interactions with the justice system, mental health, resilience, reduced substance abuse, and other crucial quality-of-life metrics that are simply not captured by measuring reinjury alone. Improved identification of these metrics and development of standardized tools to measure changes in them are critically needed. One preliminary step that is underway is the qualitative assessment of program effectiveness through client interviews. Allowing themes to emerge through the clients’ voices may provide insight into program value that is hard to measure, such as the quality of peer mentorship and the impact of Case Manager role modeling on clients’ lives. Finally, long-term follow-up of clients up to 5 years after the HVIP intensive case management experience is needed to better understand the successes and challenges of individual HVIPs in creating lasting change for their clients.

Sustainability

The hallmark of a mature HVIP is the institutionalization of its funding through incorporation into existing infrastructure, such as city, hospital, or other institutional budgets. Early government and local stakeholder engagement can play an important role in developing these relationships and crafting program evaluation plans that meet stakeholder needs. The prospect of institutionalizing an HVIP can be made more enticing to stakeholders by increasing recognition of the value of HVIPs and strong advocacy at the state or local level for health-care reimbursement systems to support case management services. Broad HVIP participation in advocacy groups, such as the NNHVIP, is necessary to create the policy change underlying these initiatives.

Clinical Pearls

- Violence is a public health issue that can be addressed by focusing on modifiable risk factors associated with violent injury.
- Social determinants of health can affect the health of entire communities by adding to the burden of chronic disease states within each generation; violence largely affects youth and young adults.
- Hospital-based violence intervention programs work within a public health framework to provide culturally competent case management and collaborate with community partners to reduce risk factors.
- Broadly speaking, health-care inequities, such as risk for violence, can be addressed by focusing on socioeconomic factors and not only considering access to care but also making provisions for aftercare that can lead to risk reduction.

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Chapter 2

The Urban Resilience Network: “TURN” to the Faith Leaders and Faith Community to Address Violence and Trauma



Pastor Chris Harris Sr.

Why Turn to Faith-Based Leaders for Trauma Counseling?

Gotta Have Faith

Eleven years ago, when I started my church’s “Prayer Around the Schools” (PATS) initiative on Chicago’s South Side, little did I know that it would spark something much bigger—an opportunity to heal my traumatized, violence-ravaged community through a program that can serve as a model for faith and community leaders nationwide.

The seed of this idea of using ministry and community leaders to address violence and trauma was planted early in my own life. Had it not been for God and my mentor, Bright Star Church of God in Christ founder Rev. James Stovall, I, too, might have been just another statistic of Chicago’s violence or what I call that cradle-to-prison or cradle-to-grave pipeline.

But thanks to my involvement with the church, my worldview was expanded, and I saw hope instead of the despair that so many of our youth see today. Bright Star became my second home when I was a child. It was there that I nurtured my love of Christ and my love of music, becoming the church’s minister of music while still a teenager. I traveled the world singing gospel and jazz, which gave me a global view of what the world was like.

Unfortunately, most youth in my Bronzeville community do not have the opportunities I had. In fact, I believe the reason we see so much violence in our communities is because many of our youth lack a point of reference and opportunity. If the kids are not coming to church, for whatever reason, I know we have to find a way to bring the church to them.

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And so it was that the PATS initiative was born. Since 2007, on every first Saturday of the month, church members and others have been praying for an hour around schools. It does not matter whether it is freezing cold or burning up outside; we are out there. Prayer may have been taken out of the schools, but prayer around the schools is fair game.

One day, church and community members and I were going from school to school praying. A grandmother heard us, snatched up her grandson, and told him, “You’re coming out here, and these church folks are gonna pray for you.” And we did! But, after we had prayed, this same grandmother told me, “Reverend, thank you for your prayers, but my family needs far more than just prayer. Where are your programs?”

I didn’t have an answer for this grandmother then, but that same year our church’s nonprofit arm, Bright Star Community Outreach (BSCO), was born.

Broadening Our Ministry

I have always believed in taking my church’s ministry beyond its walls, and BSCO allows us to do just that. I am also a believer in community self-sufficiency. We do not want outsiders helicoptering in to “save” us; our Bronzeville community of 135,000 residents wants the tools, education, knowledge, and resources to stand up and save ourselves.

BSCO now serves more than 5000 people in the community every year and partners with more than 50 organizations that are helping us implement a community action plan to help ourselves. This action plan has three focuses: The first is child/family services, which provide parenting help, mentorship, counseling, advocacy, and economic development; the second is community strategy and development, where we do community outreach, assessment, and planning, take safety initiatives, and manage various projects; and the third is our behavioral health focus, which allows us to address community mental health needs, with a laser focus on unaddressed trauma.

Today, I could tell that grandmother about BSCO’s participation in the city’s Safe Passage program, which oversees some 50 adults who patrol the neighborhood before and after school, protecting kids who could be crossing hostile gang turf. We have an after-school program that is more than just a babysitting center for kids waiting for their parents to pick them up: We make sure that folks in the program are able to move the needle forward on scholastic achievement for the children they are helping.

We also took part in a program that I really love: the Truancy Education and Mentoring (TEAM) Check and Connect initiative. TEAM allows us to make sure that there is programming available for students who are suspended or expelled from school. We do not want them at home “chillin’”; we do not want them on the

streets hanging out; we do not want them playing video games. We want them to come to us for conflict resolution. We want them to come to us for peaceful solutions, and we want to make sure that we provide mentoring for these kids. We also provide in-school programming around this effort, including workshops on avoiding gang recruitment and GED test preparation for students aged 17–21.

Other BSCO programs include a summer day camp and a summer youth employment program. In partnership with Illinois Department of Children and Family Services, we have helped more than 800 families by decreasing risk factors and increasing protective factors at home in an effort to keep kids out of the child welfare system. More about our programming is available on our BSCO website, BrightStarCommunityOutreach.com.

A Life-Changing Visit to the Holy Land

On a pastoral mission to Israel in 2012, I toured a center in Tel Aviv, the NATAL center, which treats adults and children traumatized by war violence in their country; I excitedly returned home with the idea of implementing similar posttraumatic stress counseling in Bronzeville. Although Chicago neighborhoods often have been compared to war zones, it struck me that there was not a program that I knew of here to aid victims of violence or those who had wounded them.

I am not just talking about victims of the physical violence that is rampant in Chicago. Imagine what goes through the mind of a child living in a neighborhood where adults are posted on corners like crossing guards to make sure that children are safe going back and forth to school or the youth who has seen his buddy shot dead in the street. In 2009, Derrion Albert, an honors student at a Far South Side High School, was beaten to death during a melee between gang rivals outside his school. A video of his beating was widely distributed via social media. How many nightmares did that scene bring on?

Unfortunately, in my community mental stress and pain typically go unaddressed. “It is what it is,” many shrug. But the effects of this pain are devastating. Youth living in areas of ongoing violence are at exceptional risk of substance abuse, engaging in high-risk behaviors, and being victims or perpetrators of violence.

What I have learned is that black and brown people do not go to counseling. Why? I believe there are four reasons: They do not know the counselor; they do not trust the counselor; they do not think they can afford the counselor; and nobody wants to be labeled “crazy.” This stigma is a major problem that tends to go ignored.

As my mother used to say, “Hurting people tend to hurt people,” but the NATAL center seems to have a salve for that pain. The center’s experts evaluate neighborhoods and make recommendations that help residents prevent and intervene in violence, cope with it when it does occur, and learn how to bounce back from it. Therefore, I asked for their help in Chicago.

Laying the Groundwork for Evidence-Based Solutions

My friends from NATAL have been here three times since my 2012 Tel Aviv visit: the first two times to do an assessment of the South and West sides of Chicago and the third time to offer 5 weeks of intensive trauma counseling training to Chicago faith and community leaders. After a series of site visits, interviews, focus groups, and meetings with faith and community leaders, NATAL recommended the development of a telephone helpline to support and guide residents who have experienced trauma. They also recommended the following:

- Creation of a crisis response unit made up of BSCO staff, counselors, and community leaders to be dispatched by helpline operators after a crisis to provide immediate behavioral therapy and emotional support to trauma victims.
- Creation of a “helping the helpers” program for BSCO staff and others at risk for emotional burnout from counseling trauma victims.
- Creation of programs to teach mental health professionals and doctors in general practice more about trauma therapy and how to diagnose psychological trauma early.
- Creation of programs to help schools, first responder, and community organizations become resilient in the face of trauma.
- Creation of programs to raise awareness of trauma and reduce the stigma linked to seeking mental health services.

BSCO also went directly to the youth in our community with surveys to see how we could best serve them. Amazingly, we were able to survey students at 19 schools in Bronzeville. An anonymous 137-question survey asked students how we could best address their trauma and how we could best impact their lives and decrease violence.

First time out of the gate, 1850 students of the 2250 students who were eligible to take the survey participated—an impressive 72% response rate. As a result, we now have data from nearly 1600 youths in grades 6, 8, 10, and 12 who have told us exactly what to do. The plan is to conduct these surveys every 2 years and adjust youth programming accordingly.

The survey was specifically designed to measure important youth outcomes (such as substance use and delinquent and violent behavior), as well as underlying risk and protective factors for violence and other behavior problems. The results showed high levels of youth involvement in violent and problem behaviors. They also revealed that youths experience high rates of depression and anxiety, with 67% of them saying that they worried about the safety of their family members. Low neighborhood attachment, poor family management, a family history of antisocial behavior, and loss of the community’s economic base were among the other risk factors for violent and problem behavior.

Two survey revelations brought home the magnitude of what our young people are facing today. They blew me away:

1. The students said that things were good or getting better within their school buildings; their problems were with what happens when they leave school.
2. More than 35% of the students showed signs of clinical depression.

Indeed, a school should be thought of as a safe haven (despite the rash of school shootings these days), but to think that students feel the weight of the world so heavily outside those walls is mind-blowing. It is no wonder that more than a third of students appear to be depressed.

In addition to the student survey, BSCO was also able to successfully administer a community survey to more than 400 adults spread across various census tracks in Bronzeville, and the feedback was astounding. While all of this data and more are available on BSCO's website, what most folks want to know is how we were able to get the community to participate and how we achieved that amazing response rate. I often share that since the days of Tuskegee surveys, data collection and research are often not welcome in urban communities as a result of the trauma we still feel from decades of mistreatment in this area. Faith, trust, relationship, and accountability are vital to this kind of process. We have worked diligently to maintain all four, and I now travel the country sharing methods for this achievement with others.

A Bridge Between the Facts and Faith

Whether they are organizing a civil rights march, voter registration drive, or fundraiser, faith and community leaders know how to bring people together to get a job done. It is no coincidence that some of our nation's greatest leaders found their voices and cut their organizing teeth in the church and in their communities. Just look at what a springboard community organizing was for our 44th president, Barack Obama. Faith and community leaders are a natural bridge between traumatized community residents and the professionals who can help them. These leaders are also ideally positioned to help trauma victims heal. The people we serve are both victim and perpetrator; we see their issues from all sides. We are boots-on-the-ground first responders, and people trust us. We are connected to them in ways that institutions and bureaucracies, as well meaning as they may be, are not.

In addition to being connected to our communities and having the power to galvanize them, faith and community leaders have a genuine concern for trauma victims in their communities. That means that, as a pastor, I am thinking very specifically about people who have been hurt by trauma or violence. They are in my prayers. I know their names. I know their mothers' names. I know their grandmothers' names. I know their cousins' names. I even know their nicknames. When those in medicine, God bless them, and we need them, and those in research, God bless them, and we need them, too, look at data, they see numbers. Faith and community leaders see people, and that makes all of the difference in the world.

We put our hearts into serving the people we are connected to and are concerned about. If you do not feel your community, the chances are that they will not feel you,

and the faith community understands that. While everybody is sick of hearing about violence in the news every day, not everybody is experiencing it in their neighborhoods. Until you see those people on the news as your friends and family, you will not go from being connected and concerned to being compassionate. Until you see violence as your problem and trauma as the issue that affects your house, you will never have the compassion of a faith or community leader.

Bringing It All Together: TURN—The Urban Resilience Network

All of the abovementioned work, the community effort and input, brought me to a wonderful model for helping to heal my community. While on another visit to Israel, I prayed for inspiration to come up with a name for this model, and, while I was in my hotel room, the word “turn” came to me. Thinking of this as a warning, I looked around. But the Lord said, “No, go and look up the word ‘turn’.” There were several definitions, but the one that really blessed me read “to channel one’s attention, interest, or thoughts away from or toward something new or different.” Well, that turned a light on for me because that is exactly what my goal is for trauma victims: to turn them away from the pain they are suffering toward something else—a place of hope and healing. I finally decided on the full name of my model: The Urban Resilience Network (TURN).

We are off to a fantastic start, even breaking new ground by using an anti-violence approach that has proven successful in rural areas but has not been widely used in cities: The Communities That Care strategy, pioneered by the University of Washington’s Social Development Research Group, focuses on violence prevention as a public health issue and uses data from a community to help that community design programs to curb it. As I said before, there is no “helicoptering in” here; we are hitting these problems where they are on the basis of what the people who live here say those problems are.

Our partners at the University of Chicago (Social Service Administration (SSA)), in collaboration with Northwestern Medicine and along with federal government help, will evaluate how the TURN model is working, providing valuable insights to other communities interested in replicating it.

There are five phases to the Communities That Care strategy, which sometimes overlap:

- Assessing community readiness to use the strategy.
- Organizing and training community leaders, including selecting and developing a community board.
- Assessing current programs aimed at youth and community violence and promoting positive youth behaviors.
- Creating a community action plan using programs that best fit a community.
- Implementing and evaluating the programs that have been chosen.

Where We Stand Today

Over the last 3 years, BSCO has worked diligently to develop the infrastructure for the helpline suggested by NATAL. This involved finding a software platform for the helpline, hiring a clinical director to oversee the program, and identifying faith leaders to be responsible for fielding crisis calls. Faith leaders are the ideal trauma counselors because they have extensive experience in providing spiritual and supportive counseling to community members in the church setting. In a phased approach, the first group of ten faith leaders completed NATAL trauma and crisis intervention training in October 2016. This training set the stage for our official launch in July 2017.

The first group of ten faith leaders was split into two groups. One group is charged with working the helpline and fielding calls; the other group acts as ambassadors of the program within the community, making sure that our communities are trauma informed. As the model develops, staff will be needed in the community to educate residents about the lasting effects of trauma and to raise awareness of the TURN model’s important programs, such as the helpline. The TURN Ambassador’s Network has begun to work strategically with various sectors of faith, education, business, health, and first responder organizations to market the TURN model.

BSCO officially launched the helpline with the capacity to provide trauma counseling from 9 a.m. to 6 p.m. on Mondays, Wednesdays, and Fridays. Our friends from Israel made sure to temper our expectations by telling us that the helpline phones might not ring for up to 2 years and therefore not to be discouraged. Amazingly, however, from July 2017 to mid-March 2018, dozens of people sought trauma counseling through the helpline. Callers have asked for assistance with relationship struggles, physical/terminal illness, grief, domestic violence, community violence, and abuse. This speaks tremendously to the need for this kind of support in Chicago and beyond.

TURN ambassadors have been interacting with many sectors of the community, including schools, mental health clinics, funeral directors, and violence prevention groups, to help educate them about trauma and its impact. These efforts have resulted in more than 1000 constituents being educated. Although we wish the need were not there, we are excited that people are learning that the service exists and are taking advantage of the helpline.

BSCO anticipates that the helpline and our ambassadors will become an instrumental resource for the residents of Bronzeville and surrounding communities. Together with its partners, Northwestern Medicine, University of Chicago Medicine, CIGNA, and United Way of Metropolitan Chicago, BSCO is working hard to ensure that the helpline continues to expand in impact.

The TURN model is focused on a long-term approach to helping community members struggling with trauma, whether prolonged or triggered by a recent violent event. Through relationships with first responders, such as paramedics, police officers, and other city officials, victims of trauma will be directed to the TURN model for mental health services and case management after an incident has occurred.

Through the TURN model's care coordination plan, faith leaders will have the ability to refer callers to additional mental health services and provide case management as needed. If a caller requires additional mental health services that go beyond the scope of the TURN model, they will be referred to a partner health-care organization such as Northwestern, University of Chicago, or Near North Health Service Corporation. In the future, BSCO hopes to open a clinic that will be staffed by licensed clinicians who specialize in trauma. In the meantime, BSCO is focusing on forging new partnerships with other agencies who share a similar mission to create a healthy and safe Chicago.

In conjunction with the launch of the helpline, BSCO has established a care coordination subcommittee to develop a model for providing access to follow-up mental health services after initial contact with a community resident has been made via the helpline. BSCO anticipates that additional services will include face-to-face individual counseling, group counseling, case management services, and treatment at a local federally qualified health center or partner organization. Members of the care coordination subcommittee include leaders from BSCO, Northwestern, University of Chicago, CIGNA, and United Way.

What I love most about what we have been able to accomplish is the fact that you see collaboration throughout this entire effort. This one initiative has the United States and Israel; African, American, Jewish, and other communities; University of Chicago Hospital and Northwestern Medicine; schools and principals; faith-based and community-based organizations all working together. But to me, the greatest "miracle" of all is getting faith leaders to work together—beyond borders, past egos, and all for one common goal: to help and heal those who are hurting. Why? We are all convinced that we are better together and collective impact works.

Chapter 3

A Violent Thread: How Violence Cuts Across the Generations on Chicago's South Side



Jon Lowenstein and Marisa Dharmawardene

Introduction

Chicago's South Side is one of the major centers of African-American life in the United States, with a legacy of accomplishment unparalleled in almost any other city in the country. Today, the South Side includes some of the most economically disadvantaged neighborhoods in the United States (University of Chicago Crime Lab, 2017). During much of the twentieth century, millions of African Americans escaped the Jim Crow South in search of economic and personal freedom in the North (Wilkerson, 2010).

Although Chicago offered great opportunity because of its status as an industrial center, its promised land was also replete with segregation, structural racism, and deep economic inequality. Until 1948, African-Americans were only allowed to live in certain designated neighborhoods. Once these restrictive covenants were struck down, however, black families began to move outside of their legally segregated neighborhoods within the South and West Sides of the city. White residents responded to this change by leaving the city's South Side, with many businesses following. This mass exodus—the “white flight” of the 1960s–1970s from the South Side to neighboring suburban communities—has resulted in Chicago continuing to be one of the most segregated large cities in the nation.

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The postindustrial crash of the 1970s and early 1980s further injured Chicago's Black working class. City, state, and federal government failed the poorest residents, who were left to survive with little or no support as factory after factory closed (Walley, 2013). As mainstream job opportunities disappeared, the underground economy of the drug trade—primarily crack cocaine—gained strength. Combined with extremely punitive measures of the criminal justice system, the social cohesion of the poorest strata of the community was disrupted, leading to increasing gang violence and overall crime rates. By the 1990s, what had been a “promised land” in the North offered far fewer opportunities for African-Americans.

The South Side's relationship to violence is complex and long-standing. It is intertwined with issues of income inequality and unemployment (Heller, 2014) and segregation, as well as access to affordable housing, food, and other social determinants of health (Kawachi & Berkman, 2003). Chicago has experienced decades of violence, with 39,000 homicides over the past 60 years (Bentle, Berlin, Marx, & Rumore, 2018). Homicides peaked at 920 in 1992 (Bentle et al., 2018); however, they have surged again in recent years, with 764 murders recorded in 2016 (University of Chicago Crime Lab, 2017). In Chicago, the distribution of these murders remains remarkably concentrated, with 32% occurring in just five neighborhoods of the South and West Sides (University of Chicago Crime Lab, 2017).

Over more than a decade, documentarian and community resident Jon Lowenstein has collected oral histories from South Side community members and photographed evidence of the social issues facing the community in which he also resides. In the course of wide-ranging interviews, subjects have revealed personal experiences of violence, trauma, and the impact of structural inequalities. Importantly, violence did not simply impact one particular age group or generation but reverberated from some of the youngest community members (11 years old) to the oldest (93 years old). Each oral history reveals a deep connection to the neighborhood but also an equally deep legacy of pain that has stayed with each person throughout their life.

Through photographs, captions, and personal stories of trauma, this chapter examines the lasting impact of interpersonal violence on multiple generations of South Side residents. Woven throughout these narratives are insights into residents' personal resilience and commitment to their community in spite of the significant challenges that each person has faced.



Fig. 3.1 View of Lake Michigan looking North from the 35th St. beach during a late summer storm. Chicago's South Side has experienced major changes in the past 5 years, including a multimillion-dollar rehabilitation of the lakefront. Unfortunately, as the city is repackaged, the poorest residents are being squeezed out of the city – forced to move to new communities and not reaping the benefits of gentrification and urban transformation. (© Jon Lowenstein/NOOR)



Fig. 3.2 View of the near South Side looking North from 18th St. near Chinatown. (© Jon Lowenstein/NOOR)



Fig. 3.3 Remnants of the suspension bridge at the Acme Coke Plant on Chicago's Southeast Side. The Acme Coke Plant was a vital part of steelmaking operations on the South Side of Chicago, Illinois, for most of the twentieth century. The coking process involves baking coal in huge ovens to reduce it to a more clean and efficient burning composition, which is then ultimately used as a fuel and reducing agent by blast furnaces. These massive furnaces once lined the shores of Lake Michigan below Chicago but beginning with the closing of Wisconsin Steel in 1980, all have been shut down and subsequently demolished. In 1958, a bridge was constructed to transport materials between the coke plant and the blast furnaces over the Calumet River. This 400-foot-long suspension bridge brought the coke on a conveyor belt and delivered coke oven gas to the furnace, as well as moving process steam back into the coke plant. Chicago's one and only suspension bridge—the Acme conveyor—was demolished in 2005. (© Jon Lowenstein/NOOR)



Fig. 3.4 An abandoned classroom at the Crispus Attucks Elementary School in Bronzeville on Chicago's South Side. The school was shuttered in 2008 and remains abandoned to this day. The school was one of several elementary schools that served the public housing projects along the Stateway corridor on Chicago's South Side. (© Jon Lowenstein/NOOR)



Fig. 3.5 One of the last remaining Robert Taylor Homes slowly being demolished as new developments are being built simultaneously in the foreground. The Chicago Housing Authority's Plan for Transformation demolished almost all the high-rise public housing projects in Chicago, sending residents to other neighborhoods and cities throughout Chicago and the greater Midwest. At the time of the demolitions, many residents were promised that they would be able to return to the newer buildings, but only a small percentage of people were able to do so. (© Jon Lowenstein/NOOR)



Fig. 3.6 (a, b) Brick stackers collect and stack bricks at the site of the Ida B. Wells Homes in the Bronzeville neighborhood on Chicago's South Side. Named after African-American journalist and editor Ida B. Wells, these Homes were one of the first large-scale housing developments on the South Side and were dismantled during the Chicago Housing Authority's Plan for Transformation. (© Jon Lowenstein/NOOR)



Fig. 3.7 Robert Taylor Homes: Chicago's Robert Taylor Homes was a public housing project in Bronzeville on the South Side of Chicago, Illinois, bordered along State Street between Pershing Road (39th Street) and 54th Street alongside the Dan Ryan Expressway. The project was named for Robert Rochon Taylor, an African-American activist and the first African-American chairman of the Chicago Housing Authority (CHA). It was a part of the State Street Corridor, which included other CHA housing projects: Stateway Gardens, Harold Ickes Homes, Dearborn Homes, and Hilliard Homes. Today, everything but the Dearborn and the Hilliard Homes has been demolished in the Chicago Housing Authority's Plan for Transformation. (© Jon Lowenstein/NOOR)



Fig. 3.8 Nelson Mandela and Malcolm X. Candy Store. Burnside neighborhood, South Side of Chicago. By 2012, in Chicago more young people had died in the past 5 years than in the Afghanistan and Iraq wars combined. As of 2012, when this image was made, there was still no trauma unit anywhere on the South Side, despite Chicago leading the country in homicides, with the majority occurring on the South and West Sides. (© Jon Lowenstein/NOOR)



Fig. 3.9 US Senator Barack Obama and his wife Michelle greet throngs of supporters at the 78th Annual Bud Billiken Parade on Chicago's South Side. This photograph was taken before Obama was elected the first African-American President of the United States in 2008. (© Jon Lowenstein/NOOR)



Fig. 3.10 Just minutes after a double shooting, a man lies in an alley near the 7100 S. Rhodes block in the Grand Crossing neighborhood on Chicago's South Side. This shooting was an apparent retaliation to a shooting that had happened the previous day. (© Jon Lowenstein/NOOR)



Fig. 3.11 A young girl plays hide-and-seek with her sisters outside her house on S. Chicago St. in Chicago's Pocket Town neighborhood. The family has since moved to the Englewood neighborhood, and the house, which was in decrepit condition, has been demolished to make way for new development by the Comer Foundation. (© Jon Lowenstein/NOOR)

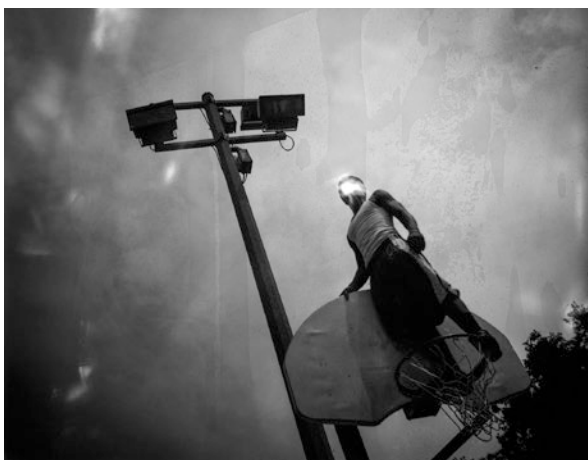


Fig. 3.12 “Vinnie” poses for his photograph on top of a basketball rim at Hoad Park in the Pocket Town neighborhood in Greater Grand Crossing on Chicago's South Side. (© Jon Lowenstein/NOOR)



Fig. 3.13 T-shirt memorial for three murder victims at Merrill Park in the Jeffery Manor neighborhood. One of the victims was Janeen Hancock, who was shot and killed while watching her son play at the park. July 2012. (© Jon Lowenstein/NOOR)



Fig. 3.14 A young man at the funeral of his 18-year-old brother, who was murdered in Chicago. He himself died 6 months later in his sleep. (© Jon Lowenstein/NOOR)



Fig. 3.15 T-shirt memorial next to a grave for a young African-American man in the Oak Woods Cemetery on Chicago's South Side. (© Jon Lowenstein/NOOR)



Fig. 3.16 View looking Northwest from 73rd St. in the South Shore neighborhood. The South Shore neighborhood was one of the wealthier and more prosperous neighborhoods that at one time had a thriving Jewish population. By the early 1980s it was almost entirely African American, and today the number of white residents is less than 1000 according to the year 2000 census. The South Side of Chicago's proud industrial communities fell onto hard times during the 1970s and 1980s, changing from thriving working-class communities to places far removed from local and federal resources, rife with unemployment, poverty, drugs, and gang violence. Despite this adversity, many residents have held on and guard deep feelings of affection for their communities. More recently, another challenge has reared its head: Residents in each of these communities face the very real possibility of being displaced from the communities they love because they can no longer afford to live there. (© Jon Lowenstein/NOOR)



Fig. 3.17 The R.I.P. T-Shirt shop. Roseland neighborhood. Violence has plagued this working-class neighborhood on Chicago's far South Side for decades. The R.I.P. T-Shirt shop is a local institution where many residents who have lost loved ones go to memorialize them on T-shirts. (© Jon Lowenstein/NOOR)

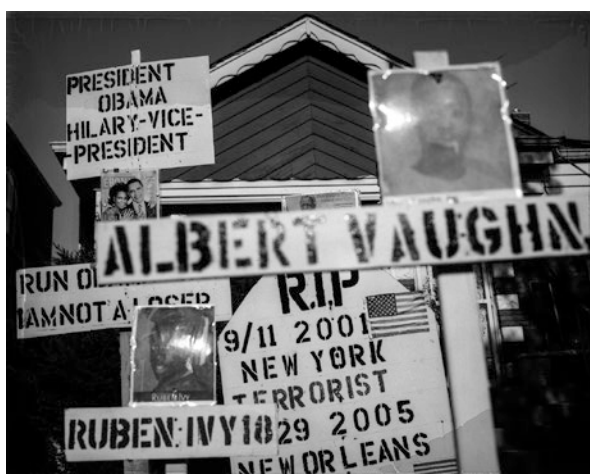


Fig. 3.18 Photograph of a house on Chicago's South Side. The owner put up a variety of signs, statements, and memorials to various local and national events. Albert Vaughn was beaten to death on April 5, 2008 after leaving a birthday party on the South Side. Nathaniel Tucker was later convicted for the murder and sentenced to 25 years in prison. (© Jon Lowenstein/NOOR)

Fig. 3.19 Abandoned house on the 8000 block of Rt. 41 on Chicago's South Side. Housing has been one of the most hard-hit areas on Chicago's South Side. (© Jon Lowenstein/NOOR)



Fig. 3.20 Chalk drawing scrawled on the back of the recently closed Guggenheim Elementary School in Chicago's Englewood neighborhood. A charter school is set to open in the same building, and the students were sent to nearby elementary schools, but gang graffiti covered the entire back of the building etched in chalk. Many of Chicago's public schools are slated for closing in the next several years. Some are reopened as charter schools or new schools within the public system. (© Jon Lowenstein/NOOR)



Fig. 3.21 Guard tower.
Cook County Jail.
Chicago's South Side.
Cook County is the largest
single-site jail in the
United States. Located at
2700 South California
Avenue in the city of
Chicago, it houses about
6500 prisoners and
employs 3900 law
enforcement officials and
7000 civilian employees.
(© Jon Lowenstein/
NOOR)



Fig. 3.22 Makeshift
memorial for an unknown
murder victim on 87th St.
and Colfax on Chicago's
South Side. (© Jon
Lowenstein/NOOR)



Fig. 3.23 Two young boys climb the fence to get a better view of the Jackie Robinson West Little League baseball team, which won the 2014 Little League World Series. The team's title was stripped after they were found to have allowed ineligible boys to play on the team. (© Jon Lowenstein/NOOR)



Fig. 3.24 South Side—Pocket Town: 9-year-old Antonio Smith was gunned down at the corner of 71st and Woodlawn in the Pocket Town neighborhood of Grand Crossing. Neighbors held a peace walk through the two neighborhoods that have been battling back and forth for years. The advice on the shrine is apropos: "Change will come when WE go get It!". (© Jon Lowenstein/NOOR)

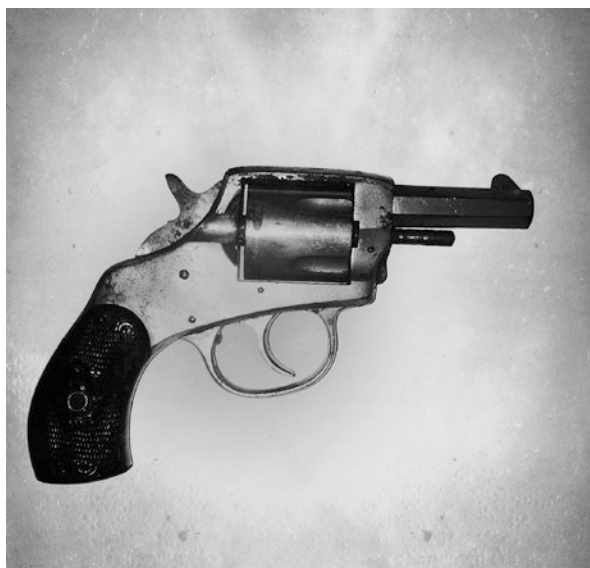


Fig. 3.25 South Side—guns seized, police evidence. (© Jon Lowenstein/NOOR)

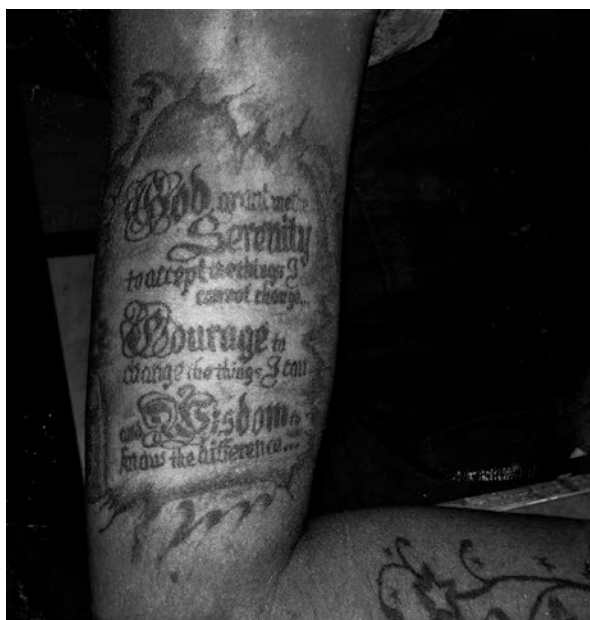


Fig. 3.26 The Serenity Prayer tattooed on a waitress's upper arm at Uncle Joe's Jamaican restaurant in the Bronzeville neighborhood on Chicago's South Side. (© Jon Lowenstein/NOOR)



Fig. 3.27 Looking for the shooter. South Chicago neighborhood—South Side of Chicago. (© Jon Lowenstein/NOOR)

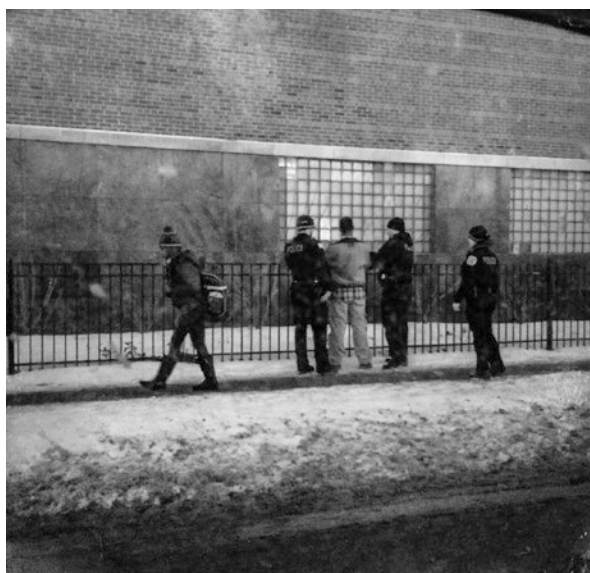


Fig. 3.28 Walking home from school on a snowy day on 71st St. in the South Shore neighborhood. South Shore is one of the more economically mixed African-American neighborhoods on Chicago's South Side. Although crime has hit the neighborhood over years, it is also home to the South Shore Cultural Center and the Jackson Park Highlands, known for wealthy residences for African-American families. Additionally, in the fallout from the city's "Plan for Transformation," the neighborhood took in the most former public housing residents. (© Jon Lowenstein/NOOR)

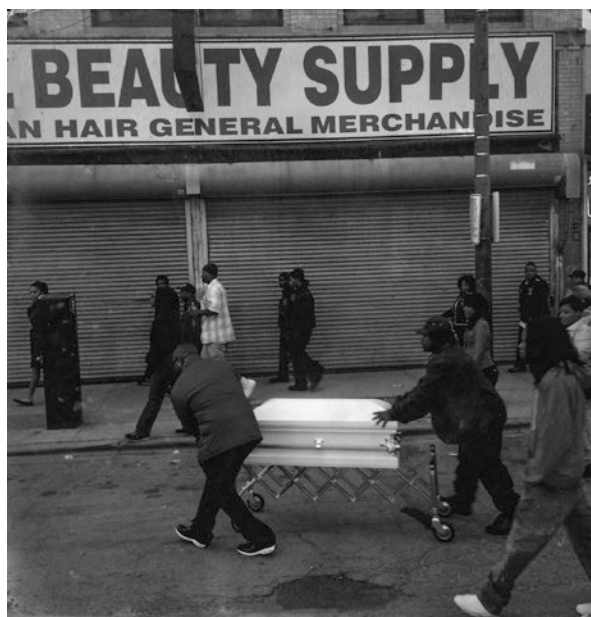


Fig. 3.29 In 2014, Jedidiah Brown organized an anti-violence march in the South Shore neighborhood. He borrowed several coffins from a local funeral home and led a march of more than 400 people around the neighborhood. (© Jon Lowenstein/NOOR)



Fig. 3.30 A young girl runs through the Dominick's supermarket at the intersection of 71st and Jeffery on Chicago's South Side. When it shuttered its doors in December 2013, Dominick's was the last full-scale supermarket serving the South Shore neighborhood. To this day, there is still no full-scale supermarket in the neighborhood of 51,000 people. (© Jon Lowenstein/NOOR)

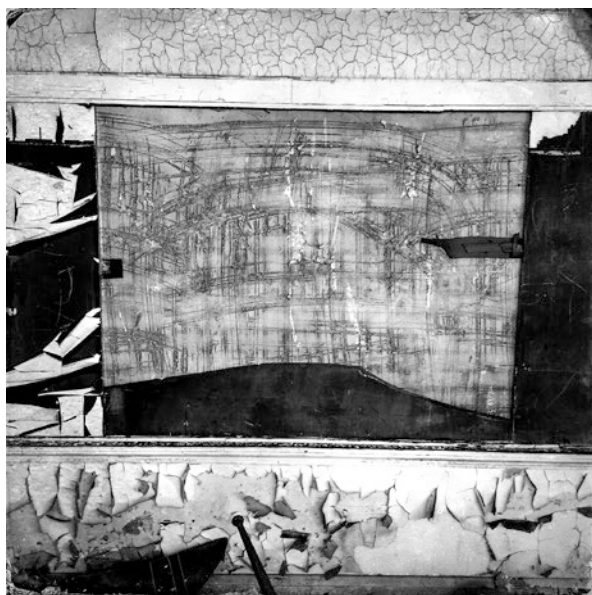


Fig. 3.31 Chalk board at the St. Laurence Catholic School on Chicago's South Side. St. Laurence was shuttered in 2002. (© Jon Lowenstein/NOOR)



Fig. 3.32 “STOP KILLIN OUR KIDS!!!!” reads the makeshift sign at 84th and Muskegon on Chicago's Southeast Side. (© Jon Lowenstein/NOOR)



Fig. 3.33 St. Laurence Catholic Church on Chicago's South Side. St. Laurence was shuttered in 2002 and demolished in 2014. (© Jon Lowenstein/NOOR)

Oral Histories

Oral History 1 – “Ava”

A 96-year-old African-American woman who grew up on the South Side of Chicago.

I: What do you remember about Martin Luther King?

A: I was volunteering in his office, right down on South Coles. He [Martin Luther King] was coming through, and I was volunteering in the office, and Martin Luther King talked with a drawl, you know, he said, “I just wanted to announce to everybody here that we’re going out on this march.” And he said, “Now, if you cannot stand to be called out of your name, don’t go. If you can’t stand anyone to spit in your face and you wanna fight back”—because remember this is nonviolent—“don’t go.” And I raise my hand, and I said, “I’ll stay here, to answer the phone.” ‘Cause if somebody spit in my face, it was going to be a fight. He said, “That’s all right Miss.” You know, he didn’t know anybody by their name. I said, “I’ll just stay here and answer the phone, ‘cause if they spit in my face, it was going to be a fight, right there.” He said, “Everybody is not made for nonviolence,” and that’s true.

Oral History 2 – “Cecile”

Cecile is 76 years old, African-American, and a resident of the South Side for more than 40 years. She bore witness to the white flight of the 1960s and 1970s and speaks to the further changes in the neighborhood in the 1980s and 1990s related to increasing unemployment, the drug trade, and dispersion of public housing

residents. The South Side has sustained significant changes in resident demographics: first, with the move of African-American residents out of previously segregated neighborhoods into other areas and the resulting “white flight.” Later, the dismantling of Chicago’s public housing, once the second largest volume of public housing in the nation, dispersed hundreds of thousands of residents across the city as part of the Chicago Housing Authority’s Plan for Transformation (Austen, 2018). This change brought new gang affiliations into the area and increasing violence across the South Side. South Shore, where Cecile continues to reside, saw the largest influx of former public housing residents. In 2013, she shot a teenage boy in self-defense after sustaining ongoing harassment by a group of teenagers in the community. The boy survived.

I: Do you remember when you moved here? What were some of the things you remember about living here?

C: Well, for one thing, from Stoney Island to South Shore Drive on 71st Street, there were merchants and businesses...and department stores. Anything that you just about wanted...you could find it on 71st. We had movie houses over here. We had bakeries over here. We had beautiful apartment buildings. We had the lakefront. I don’t know, somewhere along the line, we lost all of that.

I: Do you remember, as the businesses closed, what you were thinking? Do you remember seeing the changes?

C: Oh, yeah. It wasn’t a slow change. This was something that took place in a 5- or 10-year period. Everything had changed. The businesses were gone. The people were gone, you know. New people were moving in. And it was just the atmosphere, the element, the whole thing just not the same. It’s not the same—people breaking into people houses. Neighbors not paying any attention or not seeing anything. They were afraid to be home and to go and do a lot of things. Then the young people started to see where they could make as much money overnight as you could make in a week, you know. Then they started going to that element. Then they started hanging out on street corners, you know. Then as the people changed, the businesses closed down.

If the neighbors are not as close as they really should be, they don’t look out for one another, and they really should. I know a case of a gentleman that lived next door to this lady. He saw some kids break out all of her windows and put graffiti all over her building. He saw this. He knew who they were, but he was so afraid of retaliation for himself that he didn’t say anything. He didn’t speak even when the police went to talk to him. He wouldn’t say anything. That didn’t used to be.

I: In the past, it wouldn’t have been like that. Why do you think that the fear has grown up?

C: Because you allow yourself to be afraid. Take the seniors. These kids run rampant through the neighborhood, breaking out windows, cursing, knocking seniors down, taking their pocket books, and stuff like that. They are filled up with fear for them, you know. But some of us refuse to be afraid, and I’m one of those.

I: Those kids were harassing you for a while. Can we talk about that?

C: Well...I try not to, you know. I’ll just say this. It seemed like they had targeted me because I was alone...When he threw the brick...the brick hit me here [touches

her chest]. So, then, he had hit me with the brick. And the other one threw and hit me with [a] brick. Now, I'm standing on my steps. I backed up into the house. Go into the house. My husband had a small gun in the drawer. I went in there and I got it. They still up on top of the storage house throwing bricks. When I think about it now, I say they could've hit me with one of those bricks in the face, and I could've been maimed and disfigured or something like that. I would've been all incapacitated, and they still would be running around here terrorizing. My instinct told me, we got to scare these little bastards. That was my intention—to scare them, you know.

So, I just let off a few shots, not trying to hit nobody, just trying to scare them. It just so happen that one of the bullets tagged him, you know. So, I didn't even know that he was hit. When he ran, an off-duty or a retired policeman lived right around the corner from me. They ran right into him, and he grabbed them. He saw that [one of the kids] was bleeding. He knew it; he had heard shots.

See I was on my property, self-defense. They were hitting me with bricks, vandalizing my property. I couldn't have gone on somebody else's property and did that. They were violating me, and my privacy, and my property. So, I did what I thought I should do at that particular time. Because then they had gotten so—they really had gotten to me. And I just felt like somebody got to wake these little kids up. Not trying to kill one of them or hurt one of them or anything like that, but then I don't want to get killed. I don't want to get hurt. You's 12, 13 years old and I'm 69, and you throwing bricks at me.

Oral History 3 – “Sinclair”

Sinclair is a 46-year-old African-American professor who grew up on the South Side of Chicago and continues to live there with his wife and child. Here, Sinclair discusses the historical changes to the South Side in terms of population and his own encounter with violence in April 2009.

S: I was born here. There was never any sort of concern about getting robbed or getting caught by bullets or anything. The police had a strong grip on the streets, and the strong grip was only challenged by powerfully organized street gangs back then. So, there were two strong organizations. Now, it is anything goes, as I am able to tell, anything goes, both with the police and with the street gang activity.

With the young guys, I think it is a mental shift and...an immense amount of anger that comes with that realization that you—and your world—are physiologically being limited, either by circumstances or by people. Realistically...you feel that the ceiling is so low for you.

I: So, what does the Southside mean to you?

S: Now? It is home, capital H home, always will be home. I spent my youngest years making the most depressing and disgusting place that I have encountered in my life, my home. A place I still love, because it is my home, a place that I will never raise my son after he reaches a certain age, a place that I feel bad that my wife felt compelled to move—she is not from here; she is from California. Moved here because she thought I would feel comfortable, because it is my home. The years that we spent here through this subprime era, you know, I feel bad because I know the decision was made on my behalf, because it is my home.

We live on the third floor...On the Tuesday before my son's first birthday, I was sitting at my computer; my wife is in the kitchen; my son was asleep. I heard a noise; it sounded like a light bulb falling, crashing to the ground...So, I came out and I asked [my wife], "What was that noise?", and I couldn't see anything on the floor. And she said, "No, I don't know anything about that noise, was that even in the house?" So, we both went back to what we were doing, and before she was going to sleep, she looked at the rear window next to the back door, and she saw plaster crack in the window seal...there was a hole there on the window seal. And I don't know that she noticed it, or I was the first one to notice, across our bedroom, the hole, half-dollar-sized hole, in our far wall, right next to where her computer is. Again, this is right before my son's first birthday.

[That night] we all slept in the living room, right, on the floor, with [my son] under me and [my wife] on the couch. I didn't know what the hell was going on. But before we went to sleep, I called the police. Chicago police came, the University of Chicago police came, because we were right by the U of C. First, my wife called, and she said that the dispatcher or the operator who she was speaking to asked if she wanted them to send the police, and my wife said it was as if the woman didn't think there was any purpose of sending the police. So, the police came, and I say "Why would [someone shoot at our window], why?" You know, he's like, "You never know, that's just the way it is." This is the cop!

I wanted to know from [the police], "Ok, so something is going on in this neighborhood I need to know about, because this is April 09, there is a lot of pop, pop [gunshots] going on around here, what is going on?" He says there is some gang wars and what is going on has something to do with [the housing] projects on Cottage Grove. I knew those gangs structures as a youth, and I knew them as allied; they were on the same side...But they are warring apparently here, we think, but we are not sure, right. So, there is going to be a lot pop, pop, pop. So, I'm in the back of the car, looking like, feeling like the criminal in this circumstance, and these cops tell me they have no idea really what is going on; no more than a sociology professor in the department can tell me what is going on. It has been 2 years, and it hasn't been long enough [to] fully process the implications there. It is probably somewhere here in me, but that is probably my worst moment.

Oral History 4 – "Michelle"

Michelle is a 46-year-old African-American teacher and lifelong resident of the South Side. Although it has protected her in some ways from exposure to racism that comes with more diverse communities, she also spoke of the erosion of trust between South Side community members and the lack of resources within the community, specifically with regard to access to food. Michelle organized protests against the neighborhood supermarket, Dominick's, for providing lower-quality food to the community. Dominick's ultimately closed in December 2013, when the grocery chain closed its Chicago stores. All Dominick's locations in Chicago were bought by other grocery chains, except for the South Side store. Dominick's was the last grocery store in South Shore, and its closure resulted in a food desert (Walker, Block, & Kawachi, 2012) in the area.

M: Most of the colleges are really hard [in terms of] prejudice. When I first went to [college], it was not fun at all. I initially went there, and I was the only Black person, and I would cry every single day when I came home because they treated me so mean. They were very mean and very rude to me. I would raise my hand to professors who would never acknowledge me at all. Like I just totally don't exist, like I'm invisible, and then the children were the same way. And nobody respected me at all. Nobody was friends with me, no one talked to me, none of that. It was just like I was invisible, and I was just there.

So, that was like really, really hard, and I would cry for days, and Mum would say, "Well, Child, why don't you quit? It's not worth it." And I said, "You know what, it's worth it. I am not quitting. I don't care what they do. I'm not quitting!" I wrote an essay like everybody else, and I've worked too hard to get into this program, and nobody is going to make me quit. So, I would go there, and I would try to be real strong the whole time I was there, and the moment I would walk in the door of my house, I would just burst out into tears, and I would cry. And the reason that that was really hard is because that was the first time I've ever experienced prejudice, the very first time. Because every community we've lived in was all Black people. And the only white people I ever saw were maybe the people in the store, or maybe a teacher. But outside of that...I didn't know any at all. So that was really hard.

So, when I first came home [from college], they built the Dominick's at 71st right off Jeffrey. I went to the store, and the customer service there was very poor, and the floors were dirty. So, I tried to organize a protest in the neighborhood. I'm just that kind of person. I tried to organize a protest in the neighborhood that they should not shop at Dominick's because they were not giving us good customer service, and, if you go to the store out at Ford City, the meat was trimmed. All the fat was trimmed off the meat, but if you go to the one on 71st right off Jeffrey's, the meat wasn't trimmed...we were not getting service, and we [should] just protest this. Well, the people in the community told me that because the "mom-and-pop" stores were so expensive that they thought [Dominick's] was a good deal.

So that was a losing battle...there were a few people who protested with me, but it really never got anywhere because the community wouldn't stick together and their big thing was that they don't have cars, they can't go out of the neighborhood, and it's just too hard to do their shopping. Dominick's was cheaper than the little small stores and their food was slightly fresher. So, when I heard those type of things, I said, "You know what, we should not have to accept this." And that was like my first light bulb as to the people in my community were being treated unfairly.

Trust is a big thing with me. No one in this community has ever been in my house, no one. Because I feel like I don't want them to know what I have—and it's not like I have all this really great stuff—but I fear that if people know what I have in this house that they might come and try to break in and steal it. If people know my work schedule, when I'm coming, and when I'm going, that they will try to break in and steal what it is that I have, and I worked really hard to get what I have. So, for that reason, there is very little trust. Like the kids would come over for help or whatever, I would give them popsicles, I would give them candy, I would even tutor kids, but I would tutor them from my porch. I do not let any of the children or any of the adults into my house.

Oral History 5 – “Lorraine”

A 47-year-old African-American woman who has lived on the South Side for her entire life. She lived in the Woodlawn housing projects until they were torn down in 2006, after which she moved to the Terror Town neighborhood on Chicago’s Southeast Side. Shortly after moving there, her son was murdered. The case is still open and remains unsolved. Several years after that, her youngest son was shot, but he survived the assault.

L: I came home and everybody on the street already knew that my son was dead, but they just didn’t say nothing. I jump in the car and I go over there, and I knock on the door. I say, “Hey, you know the young guy that was killed over here was my son?” “Oh, I’m sorry to hear that, I didn’t see nothing. I don’t know.” And then you get the door shut in your face.

Oral History 6 – “Marcus”

An 11-year-old student in the Pocket Town neighborhood. He was interviewed at the Gary Comer Youth Center. He witnessed a shooting in his front yard.

M: One day, I was in my front room minding my own business and then I heard a “pow pow.” I ducked, and we went outside to see what it was. It was a boy shot in front of our yard. They threw the gun in our gate, and he was paralyzed.

Oral History 7 – “Stan”

A 21-year-old shooting victim interviewed while convalescing at the Advocate Christ Medical Center. Until the University of Chicago Trauma Center opened in 2018, many South Side shooting victims had to travel as far as 10 miles to receive care.

S: White eyes, big bulky white eyes, and the gun just going off, and that’s all I could see. I was coming from the Bud Billiken Parade party, and some guy just came out of the alley and just started shooting. It was [bullets] piercing flesh, coming out, going in, coming out...some of them didn’t come out. I’ve got hiccups. Lasted for about 5 hours last night—threw up about five times. Barely could eat. I didn’t even get shot in the stomach, but I’ve got stomach pains. Since I got shot, everybody think I’m the bad guy or I was out there doing something I wasn’t supposed to be doing. I lost all my friends except my girlfriend. I’d like to know why. Two different cliques have two different opinions on one thing. Instead of them trying to talk it out or come to an agreement—fights, shots, people get jumped, ran over by cars, people burn up houses. People want to feel like can’t nobody tell them what to do.

Oral History 8 – “Paul”

A 20-year-old African-American man who grew up on the South Side of Chicago. He discusses the change in the feeling of safety in the neighborhood during his childhood. There are many experiences of violence within the South Side, not all relating to neighborhood violent crime. Paul’s experiences of violence came from within his own family, highlighting the domestic violence that often goes unrecognized and unreported. Here, he discusses his experiences with his mother’s boyfriend.

P: On account of I grew up in Englewood and really back in the '90s, it wasn't really one of those neighborhoods where everyone was afraid to come to. It was really a down-to-earth neighborhood, and I could go outside, and I was maybe 8, 9, 10 years old, and I could stand on the corner, and it was no problem. I could walk from 66th and Carpenter; I could walk all the way to 59th and Emerald. It was no problem.

When you're growing up in those neighborhoods, you know obviously the rules are don't talk to strangers, don't accept candy from anyone, and come straight home when the street lights come on [at 10 o'clock]...No problem. Those were all simple rules I could follow. As time went on...it was no more "[when the] street lights come on [at 10 o'clock]," [it was] "You come [home] at 6 o'clock, and, as a matter of fact, don't go outside."

You know, [it] really puts a strain on your mind because you get to the point where it's like, I thought when you get older, you get more freedom and responsibility, but growing up in the neighborhood such as Englewood...the older you are, the more risk you have of dying.

He [Paul's mother's boyfriend] was the type of the person that thought violence solved everything as far as disciplining children. And my mom's talking to me, and, all of a sudden, he tries to grab my shoulder because I didn't get in the house [on time]. So, instincts took over, he grabbed my shoulder, and we got into a fight. After my mother pulled us apart, he kept charging towards me, and I thought, you know, I see why I'm fighting because this is just built-up anger from childhood and from all the times I've been really abused verbally, mentally, and physically. And he charges towards me, and I finally set him straight. I grab both of his wrists, I launch him in the air, and I slam him down onto the floor of my bedroom, and I pin him down and let him know "you don't intimidate me anymore...you're not going to really hurt me anymore, not while I'm up and standing strong." And it felt better than the first time I rode my bike and even better than Christmas.

You know, that was more powerful to me than anything I've ever done in my life, and, to this day, it still is. Because of all the verbal abuse I'd gotten over the years, all the physical abuse, and I was too young and too small to do anything about it. It was just that time for someone or something to put a stop to it. And after that, to this day, he has not looked at me like "that's the person I used to punk."

He was one of the problems, one of those milestones where I had to pass in order to progress. In a way, I kind of thank him because without all that abuse, I wouldn't have been able to get over it and get better about everything. Everything he said I couldn't do, I did it. You know, he told me I would never graduate out of grammar school. I did it. I won't be anything in high school; I can't graduate. I did it. I would never step foot in college. I did it. Because of that person that thinks you can't do things, you know, just because of him, that made me want to do it just that much more, just to prove [him] wrong, and I wanted to prove it to myself also.

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Chapter 4

Engaging People in Behavioral Crisis



Tonie Sadler and Harold Pollack

Introduction

First responders and clinicians often engage individuals who are experiencing some form of behavioral crisis. The nature and origins of such behavioral crises range from an individual who is experiencing severe mental illness or acute intoxication and is disruptive to passersby on the subway to an individual living with an intellectual/developmental disability (IDD) who does not respond to police officers or emergency medical technicians as expected during a service call to a private home. Chicago tragedies such as the deaths of Laquan McDonald and Quintonio LeGrier provide a pressing reminder that such behavioral crises can involve serious risks to the individual and others.

In this chapter, we explore the challenges faced by first responders in responding to behavioral crises. We begin by describing the tragedy that befell Robert Ethan Saylor, which is an example of one of the worst possible outcomes when first responders fail to follow basic de-escalation principles. We then describe crisis intervention team (CIT) approaches to more effectively and safely serve individuals in behavioral crisis. Finally, we draw on our work and the work of others in the City of Chicago to explore organizational and policy obstacles to effective implementation of CITs at the frontlines of first response and care.

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The Death of Robert Saylor

Robert Saylor was a 26-year-old man with Down syndrome. In early 2013, he went to see *Zero Dark Thirty* at his local movie theater in Frederick County, Maryland. He was accompanied by his attendant, Mary Crosby. When the movie ended, Saylor's young attendant asked if he was ready to go home. Saylor became agitated and angry. Ms. Crosby called Saylor's mother for advice, and she suggested that Crosby go and get the car to give her son an opportunity to calm down.

While Crosby was gone, Saylor went back to his original seat to watch the movie a second time. He was asked to leave. Against Ms. Crosby's advice, a theater manager called three off-duty sheriff's deputies who were working as security guards (US District Court for the District of Maryland, 2014). His mother rushed to the scene to help. However, before she arrived the deputies grabbed the 300-pound Saylor and tried to drag him out. Saylor ended up on the ground in handcuffs. He suffered a fractured larynx and died. The Baltimore Chief Medical Examiner's Office ruled his death a homicide as a result of positional asphyxia (Vargas, 2013). A grand jury did not bring criminal charges against the officers; however, Patti Saylor, Robert's mother, has continued to fight for legal accountability. Ms. Saylor noted in a 2016 interview that "[l]aw enforcement officers need to have an understanding that there are people who are unable to comply with direct commands, and they aren't criminals" (Vargas, 2017).

Saylor's death at the hands of police officers was an extreme event but not an entirely isolated one. IDD or related disabilities are often a factor in police confrontations that have received front-page coverage. "Baltimore's Freddie Gray... appears to have been cognitively harmed by lead paint exposure, and Chicago's Laquan McDonald experienced a complicated mix of mental health challenges and learning disabilities" (Pollack, 2016a). In addition to the cases of Gray and McDonald, there is also the case of Charles Kinsey, "the behavioral therapist shot while trying to help Arnaldo Rios-Soto, who has autism and was under his care. [Later, the] officer admitted he had been aiming at Rios-Soto" (Lewis, 2017).

In the case of 35-year-old Magdiel Sanchez, neighbors reported that they were yelling to officers that Sanchez was deaf when officers approached his home wanting to speak with his father about an unrelated incident. Sanchez was holding a pipe, which, according to his neighbors, he had used to ward off dogs. Officers started to give "him 'verbal commands' to lie down, then one fired his Taser, and the other shot him in the chest..." (Perry, 2017). Sanchez was deaf and reported to have a developmental disability.

In one national study of caregivers for individuals with fragile X syndrome (the most common heritable cause of intellectual disability), one-third of parents reported that they had been injured by their sons (Wheeler, Raspa, Bishop, & Bailey, 2016). When these injuries occurred, they were often repeated occurrences (Feinstein and Pollack 2016). One direct care professional told *The Atlantic's* Colin Friedersdorf that he prefers that his staff avoid involving the police at all costs during crises such as these. He explained that dialing 911 is dangerous because police often use tactical measures if the person of interest does not respond to or does not understand lawful orders (Friedersdorf 2015).

These realities suggest that some individuals with IDD and related disabilities will experience law enforcement encounters that pose serious risks to themselves, as well as to first responders. A 2016 study found that in the USA “[d]isabled individuals make up a third to half of all people killed by law enforcement officers” (Perry & Carter-Long, 2016). Not only do officers come into frequent and under-reported contact with people with IDD, but people with IDD are also overrepresented in the criminal justice system in general (Eadens, Cranston-Gingras, Dupoux, & Eadens, 2016; Hauser, Olson, & Drogin, 2014). At the same time, cases such as Robert Saylor’s or Magdiel Sanchez’s understandably heighten caregivers’ ambivalence about whether to call police when there is potential for violent encounters.

US efforts to improve law enforcement responses to individuals with disability have predominantly focused on mental illness. A US Senate hearing titled “Law Enforcement Responses to Disabled Americans: Promising Approaches for Protecting Public Safety” presented projects funded by the Bureau of Justice Assistance (BJA) to address police response to Americans with disabilities (Department of Justice, 2014). The report states that “[s]ince 2006, BJA has awarded 287 Justice and Mental Health Collaboration Program grants to sites that span 49 U.S. states and territories” noting that “all grants require a joint application from a mental health agency and unit of government responsible for criminal and/or juvenile justice activities” (Department of Justice, 2014, p. 4). Given that these requirements focus on mental health agency partnerships, it is perhaps unsurprising that only one noted project focused primarily on criminal justice and individuals with IDD: In 2013, a BJA grant was awarded to The Arc for the creation of the National Center on Criminal Justice and Disability (NCCJD), the first national effort of its kind; the program will develop training and provide online resources that address criminal justice and IDD (The Arc, 2018).

A 1996 study examined police training across the 50 states and found that most academies began special training on mental illness; yet IDD was rarely mentioned (McAfee & Musso, 1995). Only six states provided training on IDD. A more recent study surveyed 188 officers in the Southeast USA and found that “the overwhelming majority of police officers surveyed report that they had little or no training with regard to individuals with intellectual disabilities” (Eadens et al., 2016, p. 231).

Police departments that do provide IDD training typically provide far less time than is provided for mental illness training (Eadens et al., 2016, p. 224). Chicago’s voluntary CIT program provides 50 minutes of instruction on IDD within a 40-hour course that focuses primarily on mental illness and de-escalation. Additional instruction in how to properly communicate with people who have IDD may be especially valuable during police training (Eadens et al., 2016; Henshaw & Thomas, 2012; Spivak & Thomas, 2013).

Existing data suggest that officers—like other citizens—are often unable to recognize that an individual is living with IDD. Officers often confuse mental illness with IDD, and vice versa. One qualitative interview study examining officer perceptions of intellectual disabilities found that “most of the respondents confused intellectual disability and mental illness” (Modell & Mak, 2008, p. 187). A Queensland, Australia, study explored how officers sought to identify IDD and found that “[a]pppearance was the most commonly nominated characteristic,

followed by language difficulties, problems with comprehension, inappropriate behavior for age, and problem behavior” (Douglas & Cuskelly, 2012, p. 35). Many officers wrongly reported that people with IDD are easily identifiable on the basis of physical appearance. The Arc’s NCCJD cites estimates that more than 85% of people living with IDD have “mild” or high-functioning disability that may not be detectable.

Useful resources are now available to law enforcement, including those developed by Tennessee’s Department of Intellectual and Developmental Disabilities (see Pollack, 2016b). The Tennessee materials describe how police might recognize that individuals may have IDD, what the most common diagnoses actually are, how officers should interact with people living with IDD, and how such interactions go awry (Pollack, 2016a).

Basic information is often most useful to police officers and other first responders. For example, many individuals with IDD respond literally to simple questions and instructions. Thus, if a police officer asks, “Are you hearing voices?” people with IDD might respond, “Yes,” simply because they heard the officer ask the question.

Dr. Bruce Davis, the director of behavioral and psychological services at Tennessee’s Department of Intellectual and Developmental Disabilities, and his colleagues offer useful strategies for officers to use time and distance to slow situations down to avoid physical confrontations: “One thing I try to do... is to turn around the idea that the successful intervention is a collar, or an arrest.... We turn it into the idea that a successful interaction is a de-escalation. We talk about quiet authority and how much more effective that can be in working with many people, particularly a person with intellectual disabilities.... It’s a reconceptualization of the police officer’s role” (Pollack, 2016a).

Tennessee materials also teach officers about specific health risks that individuals with IDD may experience when they are physically restrained. One critical principle is to restrain resistant subjects on their sides rather than face down and to watch the restrained person’s face for signs of distress. Many deaths occur because officers restrain a person in a prone position and then apply pressure to the neck, back, or chest in ways that can cause lethal aspirations or positional asphyxiation. Many people with IDD have respiratory disorders, GI reflux, or morphological defects that make prone restraint especially dangerous.

Time and Distance as Fundamental CIT Strategies to Address Individuals in Behavioral Crisis

Although it would be useful if misperceptions could be dispelled regarding specific disabilities, first responders will rarely be in a position to reliably diagnose unfamiliar individuals whom they encounter through service calls or in the course of street patrols. Even rarer are situations in which first responders would be able to reliably

use granular diagnoses to improve immediate interventions. Fortunately, basic CIT and de-escalation principles are broadly effective across a range of situations, conditions, and disabilities that bring people into high-risk contact with police.

Consider again the death of Robert Saylor. Although Saylor's particular behaviors reflected his intellectual disability, that disability was not a central or unique factor in the confrontation that led to his death. Similar tragedies arise among individuals who face other psychiatric, medical, or substance use disorders—or who have no disability but simply defy police instructions. Indeed, a United Airlines passenger was seriously injured by police at O'Hare Airport when he refused to leave his overbooked seat in 2017. The passenger later reached a settlement with the airline (Zumbach & Byrne, 2017).

The officers dealt with Mr. Saylor's defiant but non-dangerous behavior by seeking to establish their physical dominance when they could have kept their distance and waited for him to calm down or for more-experienced help to arrive. His attendant was available to help. His mother was en route. Saylor was angry and frustrated, but he was sitting down. He was not a physical threat in that moment, yet the effort to remove him threatened serious injury to both himself and the officers. These deputies defended their actions in an ensuing legal proceeding (Perry, 2013), arguing that they had followed their training in their steady escalation in the use of force (Hermann, 2014). Regardless of the merits of this specific case, their defense accurately described poor police training in many departments (Hermann, 2014; Perry, 2013).

First responses to defiant behavior such as Robert Saylor's can often be addressed through intervention strategies that involve patience, distance, and de-escalation. These methods are effective for a broad range of individuals experiencing a behavioral crisis, including children, teenagers, and people with psychiatric, medical, or substance use disorders. The tragedy that befell Saylor is one of many cases in which emergency responders, after their training, pursue an escalating tactical intervention to establish their authority over someone who is unable or unwilling to respond as expected to these methods. According to *The Washington Post*, 987 people were shot and killed by police in 2017, and a mental health crisis was involved in a quarter of those incidents (The Washington Post, 2018).

In response to the increasing number of headlines reporting these tragic events, police departments across the country have implemented intervention training to address the specific set of challenges officers face when responding to a behavioral crisis. In particular, the crisis intervention team (CIT) model has been the predominant intervention adopted in the USA: "About 2,800 CIT programs operate across the country... That represents 15% of police jurisdictions nationwide" (Lucas, 2016). This number continues to grow.

What is now known as the Memphis CIT approach was developed after a fatal 1988 police shooting of a man with a history of mental and behavioral health concerns (Dupont & Cochran, 2000; Watson & Fulambarker, 2012). This approach seeks to improve both officer and subject safety in potentially dangerous encounters and to appropriately divert persons from the criminal justice system to mental health or addiction treatment (Watson & Fulambarker, 2012).

The CIT model includes two core elements: a time-and-distance paradigm in the immediate response to behavioral crises and the development of partnerships with community health and mental health agencies (Canada, Angell, & Watson, 2010). The CIT model (not to be confused with Tennessee's complementary but IDD-specific training described earlier) is based on a model developed by the Memphis, Tennessee, Police Department, and a national CIT curriculum was developed in partnership with the National Alliance on Mental Illness (NAMI). The voluntary 40-hour training consists of didactic lessons in mental health, disabilities, and other focus topics. Training includes instruction on de-escalation approaches, and officers are introduced to community and family members through panel discussions.

The existing literature is limited regarding the full range of outcomes that first responders and clinicians seek to achieve with a CIT program. Current studies indicate that police officers perceive several benefits of CIT, including departmental effectiveness, improved perceptions of mental illness, increased verbal engagement and negotiation, and increased likelihood of referral to treatment (Bonfine, Ritter, & Munetz, 2014; Canada et al., 2010; Canada, Angell, & Watson, 2011; Compton, Bahora, Watson, & Oliva, 2008, Compton et al., 2014; Ellis, 2014; Ritter, Teller, Munetz, & Bonfine, 2010; Watson, 2010; Watson, Swartz, Bohrman, Kriegel, & Draine, 2014; Watson, Compton, & Draine, 2017). Watson et al. (2017) argue that the CIT model can be considered an evidence-based practice "for officer-level cognitive and attitudinal outcomes" (Watson et al., 2017, p. 431). More research is needed to determine whether the use of a CIT is predictive of officer force and whether officer perceptions translate to a behavioral change or to improved long-term outcome for individuals in behavioral crises (Broner, Lattimore, Cowell, & Schlenger, 2004; Charette, Crocker, & Billette, 2014; Compton et al., 2008, 2014; Cross et al., 2014; Franz & Borum, 2011; Teller, Munetz, Gil, & Ritter, 2006).

Survey analyses of CIT training found major increases in officers' self-reported preparedness to respond to a mental health crisis (Ritter et al., 2010), as well as improved knowledge and perceptions of mental illness (Ellis, 2014). Officers who have received CIT training also report increased confidence in their ability to address complex response calls involving individuals with mental illness or disabilities (Bonfine et al., 2014; Canada et al., 2010). Canada et al. found that "police, irrespective of whether they received CIT training, perceive an array of benefits of CIT implementation" (Canada et al., 2010, p. 86). Other studies indicate that the use of a CIT may prevent arrests and connect people experiencing a behavioral crisis to mental health services and substance abuse counseling (Broner et al., 2004; Teller et al., 2006).

Existing research also identifies specific challenges that first responders face when responding to a person experiencing a behavioral crisis. An analysis of Chicago's CIT implementation, along with other research examining behavioral crisis response, found that resource constraints and organizational barriers hinder effective response to behavioral crises (Canada et al., 2010; Compton et al., 2014; Sadler & Pollack, 2017; Wood & Beierschmitt, 2014).

Perceived lack of cultural commitment within first responder organizations particularly hinders efforts to implement a time-and-distance paradigm because these responses typically require more time and trained manpower than is immediately available. Canada et al. (2010) note that police respondents “cited insufficient police resources as a barrier to CIT success” and attributed “this barrier to a lack of support for CIT from [the] department’s highest-ranking administrators” (pg. 8).

More specifically, officers reported that CIT programs cannot function properly without sufficient numbers of CIT-trained officers. The number of trained officers is insufficient to deal with the number of mental health calls. This lack of cultural commitment is also reflected in the belief among many officers that a CIT program is a “warm and fuzzy” activity peripheral to the core law enforcement mission. Police departments around the country have increased efforts to address these challenges. The City of Chicago has taken steps to increase the number of CIT-trained officers to 25% of the Chicago Police Department (CPD). Efforts to train Chicago Fire Department (CFD) employees and emergency 911 call takers have also begun.

Other case studies also expose additional concerns beyond the quality and safety of police encounters. Many stakeholders express frustration about the “revolving door” of the emergency department, where the same people continuously cycle in and out of the emergency room. Wood and Beierschmitt (2014) explain that “the cycle of crisis response is perpetual,” which becomes demoralizing to officers and other first responders. One officer noted that “[i]t is not uncommon . . . to have officers transport a person for emergency services and then see that individual on the streets 24 hours later,” citing deficient mental health and addiction services in his community (Canada et al., 2010).

The continuing shortage of mental health services proves particularly frustrating to officers and mental health providers. (Chicago itself has experienced the closure of two inpatient facilities and six mental health clinics since 2009.) The Affordable Care Act’s Medicaid expansion has helped to ameliorate some of these challenges, yet many access barriers remain, particularly for individuals with complex needs, including those with mental illness and accompanying comorbidities. Compton et al. (2010) acknowledge “[c]hallenges related to poor availability of psychiatric emergency receiving facilities.” Additionally, many emergency departments “are not equipped to handle the high risk” involved with a behavioral crisis (Canada et al., 2010). A specialized psychiatric triage facility with a no-refusal policy, which would provide an efficient hand-off process, may allow officers to return to their duties in a timely manner.

In addition to mental health resource constraints, first responders report multiple service calls to the same address or to serve the same individual—often at a public or nonprofit facility or location. Such repeated service calls reflect chronic needs that are not successfully addressed. First responders often know the rhythm of particular risk spots, which Wood and Beierschmitt (2014) refer to as “micro-places.” These specific “micro-places” systematically require special attention on a daily basis, and vulnerable people who frequently encounter first responders in a state of

crisis spend their days within these spaces. The phenomenon of “micro-places” reveals that “vulnerability is nuanced, and untapped,” and there is an opportunity for “upstream” early interventions to foster long-term recovery and stabilization of vulnerable people (Wood & Beierschmitt, 2014).

Finally, emergency response to behavioral crisis requires the effective coordination of many actors and organizations: police, 911 call takers and dispatchers, paramedics, emergency department triage, mental health providers, and direct care workers in facilities that serve individuals at high risk. Organizational policies do not always align, and information is often imperfectly communicated in this effort. For example, the Chicago Police Department (CPD) and Chicago Fire Department (CFD) follow different policies and procedures regarding transportation to emergency departments. CFD ambulance personnel are required to transport a patient to the nearest hospital. In contrast, CPD staff must transport patients to 1 of 14 designated hospitals that have agreed to accept these types of transports. This is a particular challenge when both CPD and CFD personnel respond to the same individual in distress. It is not always clear which party—CPD or CFD—should transport the person of interest to the hospital.

In addition to policy conflicts, Wood and Beierschmitt (2014) argue that “system-wide information sharing is essential” to improve linkages between the multiple stakeholders involved in a behavioral crisis. Shared information between departments, for example, between officers and mental health providers, about the specific individuals they are encountering would allow for a more comprehensive assessment of the situation and how to specifically address it. Canada et al. (2010) add that “[c]ollaboration with treatment providers is a core component of the CIT program”; however, they note that this collaboration only occurred in high-resource, high-saturation districts. Similarly, mental health providers in Chicago and the CFP and CPD reported a general lack of streamlined communication between the key stakeholders that engage in behavioral crises (Sadler & Pollack, 2017).

Practice Implications

Emergency first responders must frequently engage people in behavioral crisis. High-profile tragedies underscore that such encounters can end poorly, and even fatally, because of a myriad of preventable failures that stem from a general lack of training and understanding, unnecessary tactical force, and miscommunication or ill-advised organizational policies. Although specific successes and failures depend on specific context, police departments and other first responder agencies can prevent many tragedies by valuing de-escalation as a core principle and by using basic CIT time-and-distance principles instead of tactical intervention in the management of behavioral crises.

In addition to embracing these de-escalation approaches, law enforcement and healthcare systems must consider several cultural, structural, and financial investments that can improve both first response and subsequent follow-through.

Improved Information Flow and Training

The following are often useful to first responders: basic information, such as potential communication challenges; engaging in a time-and-distance approach; and generally improved awareness and empathy for individuals who experience behavioral crisis.

CIT training improves officers' perceptions and knowledge of mental illness and increases their verbal engagement and negotiation and the likelihood of referral or treatment rather than arrest. However, as noted, most training includes little information about other disabilities, such as IDD, and these should be addressed in any type of de-escalation training. First responders require thorough and balanced information on the many types of disabilities that they may encounter, in addition to being taught the time-and-distance paradigm.

First responders should not seek to definitively diagnose individuals they encounter in behavioral crisis. Indeed, first responders cannot and should not and generally do not have to diagnose particular conditions. Rather, at the core of this type of response training is a common set of behaviors that require intervention strategies involving patience, distance, and de-escalation rather than more aggressive tactical interventions.

Manpower Investments

Effective de-escalation is labor-intensive. It requires sufficient numbers of CIT-trained officers and strategic placing of officers in appropriate districts. It also requires sufficient general manpower so that police and other first responder organizations can devote significant time on-site to an individual who may require a prolonged response. When resources are scarce, police and others may feel compelled to impose a more coercive response, simply because they cannot allow multiple officers and other first responders to spend an hour with an individual on a busy Saturday night when they feel genuine pressures to respond to other important service calls.

Manpower investments to address these challenges could be made at the cultural, structural, and financial levels to ensure the success of CIT and other first-response de-escalation interventions. At the financial level, departmental commitment could be reflected in investments in structural support so that first responders have more time to properly engage in de-escalation. This could involve increasing the amount of CIT training provided to first responders, including regular refreshers. If more CIT-trained officers are available, proper response to behavioral crises is more likely. Cultural investment emphasizes the importance of valuing a de-escalation model, reflected in departmental culture through structures that incentivize personnel to engage in this type of response. Finally, structural investments could be addressed by providing an appropriate amount of CIT-trained first responders to reflect the structural layout of "micro-places" that vulnerable populations frequent.

Preventative and Follow-Up Measures

What happens before and after first responders engage someone in behavioral crisis is no less important than what happens in the encounter itself. Although the most dramatic failures of de-escalation might involve cell phone videos of a violent confrontation after a 911 call, the most widespread failures often involve what happens later, when an individual is brought into custody or brought to medical attention, and no effective intervention is provided.

First responders are frustrated when they regularly observe that the chronic needs of specific individuals are not being addressed, as evidenced by the “revolving” emergency room door mentioned above. Such failures undermine the effectiveness of first responses. These failures also undermine the legitimacy among first responders of less-coercive approaches that leave individual and community needs unresolved.

Communities require greater practical access to mental health and substance use services, particularly through improved efforts to implement Medicaid-funded services. While “first-generation interventions” or “connecting interventions,” such as the CIT intervention, focus on connecting a person to mental health treatment to reduce criminal justice involvement for individuals with mental illness and IDD, “there are calls to move ‘upstream’ and bolster early intervention and re-intervention in furtherance of long-term stabilization and recovery” (Wood & Beierschmitt, 2014, p. 2). In particular, Epperson, Wolff, and Morgan (2014) offer a conceptual framework that addresses structural and environmental factors that predict criminal behavior. They argue that this model allows for the opportunity to identify “intervenable” risk factors that focus on both “person” and “place.”

This next generation of interventions calls for comprehensive treatment and recovery supports that address not only an individual’s disability, mental illness, or addiction but also the environmental and structural challenges that individuals face, including poverty, homelessness, and environmental trauma. The availability of non-refusal specialized emergency triage facilities that focus on crisis intervention, in addition to addressing other important structural barriers, may provide more comprehensive treatment and stabilization options. The availability of such facilities may also provide an efficient hand-off process so that officers are freed up to return to their other duties. In addition to specialized treatment facilities as a place of diversion from incarceration, emphasis on the integration of jail-based mental health services provides yet another crucial axis point to enhance long-term stabilization.

First responders, social service agencies, and at-risk individuals and their loved ones would all benefit from collaboration to conduct site-specific and individual-specific coordination to better identify and serve individuals with chronic behavioral health concerns. Specific sites could be identified by using dispatch, police, and ambulance data to identify “high use” sites of behavioral health crisis calls and interventions. This strategy was recently employed in Chicago, and Tentner et al. (2019) found that in connecting police arrest and fire department behavior health involved ambulance event data, they were able to identify at-risk high-user individuals as well as the top 100 high-use locations. These sites included individual fami-

lies; group homes and facilities serving people with predictable needs; and places that receive numerous behavioral crisis calls, such as Chicago's Union Station, the ends of popular public transportation lines, and other locations. Integrating police and ambulance data hold promise "to support proactive interventions to prevent or improve response at these encounters" involving individuals with disabilities experiencing a behavioral crisis (pg. 607).

Steps to identify individuals with chronic behavioral health needs should allow greater opportunities for individually tailored preventative and follow-up interventions. Person-centered behavioral support plans can be developed to address predictable risks and include specific de-escalation strategies. Robert Saylor's death may have been prevented if an appropriate person-specific plan that included crisis prevention, crisis response, and crisis follow-up had been in place. In fact, Saylor had a unique fascination with police officers, and he greatly admired their work. Before his death, Saylor's mother delivered cookies to their local police department, thanking them for spending time and talking with Saylor. If the officers had had access to de-escalation training and more timely information about Saylor's behavioral patterns, this tragedy may have been prevented, and Saylor may have continued his positive experiences with his local first responders.

Interorganizational Considerations

First response to someone experiencing a behavioral crisis involves many stakeholders, including police, paramedics, 911 call takers, caregivers, mental health providers, emergency room professionals, the individual experiencing the crisis, and often others. With so many hands on deck, streamlining policies with the day-to-day realities of emergency first response is a major challenge.

All stakeholders involved in behavioral health crisis response must communicate well to avoid further complicating an already challenging situation. Coordinating this response requires many steps, including reviewing and streamlining written policies across organizations to ensure that there are no direct policy conflicts. Also, a substantive awareness of what first responders are experiencing at the street level should be assessed by districts and departments so that they can develop interventions and policies that are "realistic," given the available resources and specific challenges that first responders face. Finally, collaborative stakeholder behavioral crisis response training focusing on interorganizational operations would be a good start in assessing current operations.

Clinical Pearls

- *Improved training:* First responders require thorough and balanced information on the many types of disabilities that they may encounter, in addition to being taught the time-and-distance paradigm when intervening with someone experiencing a behavioral health crisis. To address this gap,

expanding CIT training substantively to include more granular coverage of multiple disabilities a first responder may encounter as well as investment to train more officers in CIT is necessary.

- *Investing in de-escalation*: Organizations charged with first response must make greater financial, cultural, and structural investment in de-escalation models. Increased funding for programs like CIT—and, more importantly, supporting investments and organizational commitments to its practical implementation—is needed to address these gaps.
- *Preventative and policy measures*: Next-generation interventions call for comprehensive treatment and recovery supports that address not only an individual's disability, mental illness, or addiction but also the environmental and structural challenges that individuals face, including poverty, homelessness, and environmental trauma. Predictive data analytics using police, dispatch, and ambulance data could also help identify “high use” individuals and locations to develop site- and individual-specific interventions.
- *Interorganizational considerations*: Multiple stakeholders are involved in emergency response, including police officers, emergency medical technicians, dispatchers, and social workers. Efforts such as collaborative stakeholder behavioral crisis response training and streamlining policies across stakeholders would help to improve communication and intervention strategies among the multiple stakeholders.

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Chapter 5

Violence Is a Contagious Disease: Theory and Practice in the USA and Abroad



Gary Slutkin and Charles Ransford

Introduction

The data show that violence should be fundamentally redefined as primarily a health issue. In addition, health approaches need to be much more broadly utilized to understand and explain why violence occurs and used by community-based workers to detect, interrupt, and prevent violent events and outbreaks, reduce the spread of violence, and maintain safe and healthy communities. Relatively standard, well-tested, and highly effective public health approaches are being increasingly applied to the problem of violence and show strong evidence of impact among individuals and whole communities. The active involvement of the health sector in the management and treatment of violence is long overdue, specifically through more operational and vigorous implementation of the means of prevention and epidemic control that the health sector knows well and applies effectively for so many other problems.

Understanding Violence as a Health Issue

Violence is a health issue because there is a specific scientific health lens that helps us to better understand and effectively prevent violence. The health perspective means viewing violent behavior from the perspective of epidemiology, physiology, biology, neuroscience, psychology, and sociology. This health perspective recognizes that people doing violence, as well as those who have been affected by violence through injury and exposure, essentially have a personal health problem—a problem of exposure, contagion, and trauma or pain. Violence is also more specifically a

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public health problem because it poses a serious threat to the health of populations and because public health techniques can be effectively utilized to reduce the prevalence and incidence of violence and make communities safer and healthier.

Additionally, the health perspective on violence automatically follows from the fact that violence fulfills the criteria of a contagious disease. A disease is defined as “any deviation or interruption of structure or function of a part, organ, or system of the body, as manifested by characteristic symptoms and signs (causing morbidity and mortality)” (Dorland, 2010). Violence affects the structure and function of the brain, has characteristic signs and symptoms, and causes morbidity and mortality. It also demonstrates the population characteristics of a *contagious* or *epidemic* type of disease, specifically through its clustering, spread, and transmission (Fig. 5.1) (Slutkin, 2013). The transmission of violence between *people* has been well documented for child abuse (Widom, 1989), community violence (Bingenheimer, Brennan, & Earls, 2005), and intimate partner violence (Ehrensaft et al., 2003); it has also been shown between *syndromes*, for example, community violence exposure was found to increase the risk of perpetrating domestic violence (Mullins, Wright, & Jacobs, 2004).

In recent years, much progress has been made in understanding *how* violent behavior is transmitted—both in terms of social psychology and the underlying brain mechanisms (Fig. 5.2). At the individual level, violence is transmitted through

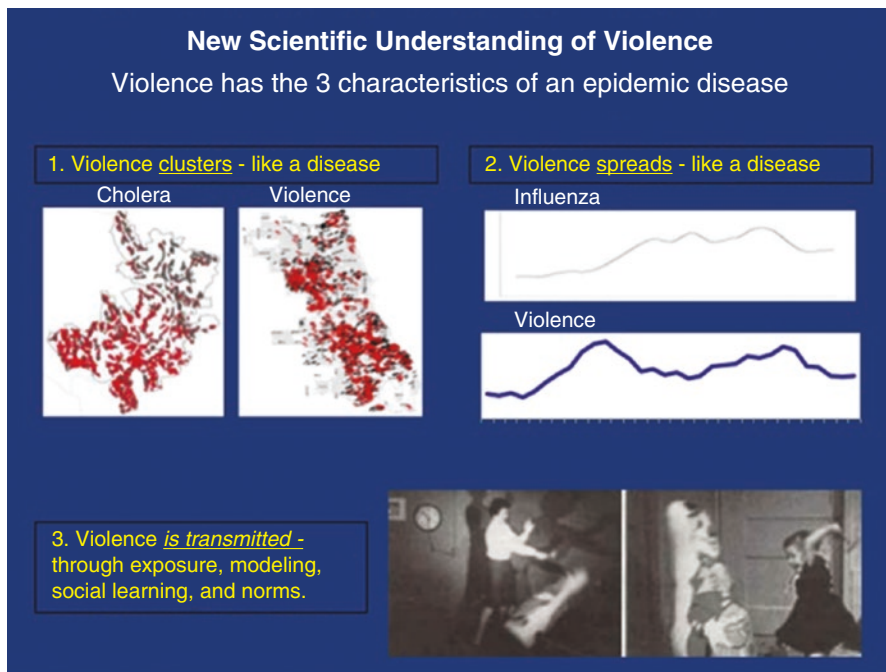


Fig. 5.1 Violence meets the criteria for a contagious problem

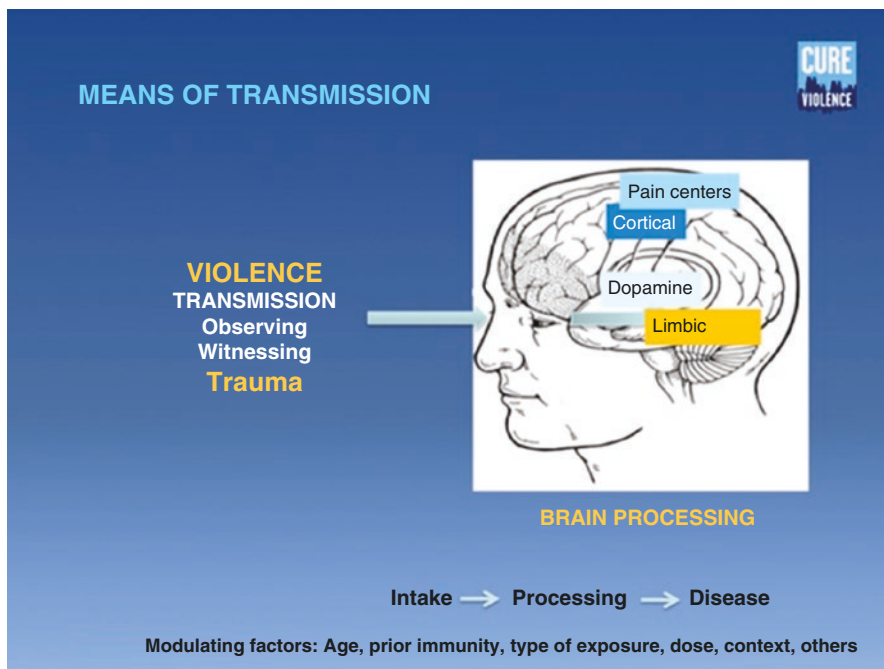


Fig. 5.2 Means of transmission for violence

social learning or modeling (Bandura, Ross, & Ross, 1961; Slutkin, 2013) and, at the group level, through social norms and scripts. For example, in a climate of chronic community violence, violence becomes the accepted or even expected response to conflict, including small disputes, perceived slights, or insults. Such street codes emphasize toughness and quick, violent retribution for transgressions against one's sense of self or insults to one's reputation. Failure to respond can be perceived as or thought to be perceived as a sign of weakness, with a possible ensuing loss of status that can predispose the victim to further victimization (Anderson, 2000). Similar norms and expectations also play a significant role in perpetuating other types of violence, including child abuse (Spinetta & Rigler, 1972) and intimate partner violence (Ahmad, Riaz, Barata, & Stewart, 2004).

Violence has the added effect of being a traumatic experience; such experiences can have a profound mental impact and physiological effects. Exposure to violence can lead to several adaptive responses, including aggression, impulsivity, depression, stress, and exaggerated startle responses (Mead, Beauchaine, & Shannon, 2010; Singer, Anglin, Song, & Lunghofer, 1995), and those with chronic exposure have shown a more than 30 times greater risk of future violent behavior than those with low exposure (Spano, Rivera, & Bolland, 2010).

The Health Approach to Reducing Violence

The health perspective on violence is based on science and allows us to move away from a moralistic perspective that understands violence as caused by “bad” people and “evil.” Thinking about good and bad people is replaced by a focus on good and bad outcomes, with people viewed under contextual, biological, environmental, and social influences. From a health perspective, the preferred outcome is to maintain and improve the physical, mental, psychological, and emotional well-being of each individual and of the community. Health approaches avoid harm at all costs and instead provide care, guidance, and education. There is no role for punishment in health-based solutions. Health approaches are neutral with regard to ethnicity, culture, race, gender, class, and sexual orientation, although they still take different influences and manifestations into account.

Care is the fundamental guiding principle of health and health systems, and prevention is a way of providing care before medical problems occur. By understanding the effects of exposure to violence, the symptoms (and latency) of violent ideation, and the effectiveness of particular methods of behavior change, care, or treatment, we can identify and successfully treat people before they become violent. Furthermore, understanding and trying to reduce additional risk factors and enhancing protective factors can and should be used to help persons become less susceptible to violence and increase resistance to the transmission and progression of violence.

Many programs, models, and system changes are already being used in health approaches to violence, although some people may not identify their approach as a *health* approach. Health approaches for preventing violence are those that:

- Are based on an understanding of how violent behaviors are formed and of the effects of exposure to violence
- Apply a preventative approach
- Use evidence-based or evidence-informed approaches
- Are nonjudgmental
- Have a commitment to do no harm
- Approach people through the lens of care.

Health approaches to violence typically fall into four categories, which can be implemented in combination or individually:

1. *Stopping the transmission of violence* by detecting situations in the community where the risk of future violence is high and preventing these situations from becoming lethal
2. *Identifying and treating those at highest risk for violent behavior*, in the same way that health Outreach Workers identify and treat those suspected of having tuberculosis, syphilis, gonorrhea, HIV/AIDS, or even Ebola—all of which also are not obvious and are frequently hidden from persons with authority

3. *Addressing environmental factors*, such as community norms and social determinants of health, to reduce the *community's* susceptibility or increase its resistance to the violence epidemic
4. *Addressing risk factors* (and protective factors) that affect an *individual's* susceptibility or resistance to the violence epidemic, such as mental health issues and alcohol and drug use.

All of these approaches address violence as a behavior and implement health methods that reduce the likelihood of that behavior occurring. Multiple approaches should have a cumulative effect, and all approaches should be carefully monitored and adjusted as needed. All these approaches are important in preventing violence. As with other transmitted diseases, however, the ongoing transmission of violence is the most urgent risk.

Beyond individual approaches, these health approaches can be more systematically implemented across multiple sectors to more effectively prevent violence. What is needed was identified 30 years ago by the US Surgeon General C. Everett Koop's "Workshop on Violence and Public Health": "[E]ducation of the public on the causes and effects of violence, education of health professionals as to better care for victims and better approaches to violence prevention, improved reporting and data-gathering, some additional research, and increased cooperation and coordination—networking if you will—among health and health-related professions and institutions" (Cron, 1986, p.12). In essence, Dr. Koop saw the need for a health system to respond to violence as a health problem in a much more energized and comprehensive way.

Health approaches do not only come from the health sector. Other sectors can take the principles of health approaches and apply them in different settings. For example, schools and educators can learn methods of screening students to determine whether they have had exposure to violence and are at risk for becoming violent and then make appropriate referrals for treatment. Law enforcement is currently being trained in—and could benefit from even further training in—peaceful mediation and de-escalation of conflict. Further, many law enforcement departments are also providing real-time information to health and related professionals and referring people to them; this information can be used to detect conflicts and prevent violence and can help in the treatment of trauma.

The entire justice system, including prisons and jails, probation and parole, prosecutors, defense attorneys, and attorneys general, can adopt a perspective that recognizes both violence as a behavior and the impacts of exposure to violence. This perspective can result in an increased use of treatment services for trauma and mental health care, behavior change, and interruption of conflicts, leading to less violence.

Many other agencies that come into contact with people traumatized by violence, such as child welfare agencies, are also important in detecting ongoing violence and identifying those exposed to violence or who are at risk of violence. Likewise, any agency or organization that is involved in planning or maintaining the built environ-

ment, such as parks and public areas, should consider a health perspective to reduce risk of violence, and many do. These parties, and others, have been working toward preventing violence and have already been incorporating many health-based and related principles and approaches; hopefully, they will continue this trend.

The Epidemic Control Approach to Reducing Violence

Epidemic control is a subspecialty of public health that has specific considerations, concerns, and methods. The epidemic control method specifically combines all of the above-outlined elements of a health approach to preventing violence. One prominent example of the epidemic control method of violence prevention is the Cure Violence Health Model. This model outlines its main components as follows:

1. *Detect and interrupt the transmission of violence* by anticipating where violence may occur and intervening before it erupts.
2. *Change the behavior of the highest potential transmitters* by identifying those at highest risk for violence and working to change their behavior.
3. *Change community norms* by influencing social norms to discourage the use of violence.

These three main components are discussed in more detail below.

Detect and Interrupt the Transmission of Violence

The Cure Violence model deploys Violence Interrupters, who use specific methods to locate potentially lethal, ongoing conflicts and respond with a variety of conflict mediation techniques, both to prevent imminent violence and to change the norms around the need to use violence. Violence Interrupters formulate and regularly update a plan of action that lays out a strategy for gathering information and assessing its accuracy and use. Part of this plan includes establishing and maintaining relationships with key individuals in the program area who are likely to have knowledge of or involvement in conflicts, shootings, or plans for retaliation to previous events. Additionally, program sites receive information from local law enforcement on shootings and killings. Some programs have partnerships with local hospitals and are notified immediately when gunshot wound victims are admitted to emergency rooms.

Before acting on sensitive information, Violence Interrupters consult multiple sources to sift through the information, validate facts, and assist each other in the detection and prevention of potential events and conflicts. Violence Interrupters then gather more information about a specific potential conflict, find out who was involved, and determine which team members are best positioned to respond to the situation. Intervention may take place by talking over the phone or one-on-one with

key players or “influentials”; by hosting a small group “sit-down” or peace-keeping session; or by taking other steps to foster diplomacy between groups, including bringing in a respected third party to negotiate. Violence Interrupters use various methods of interruption, such as creating cognitive dissonance, demonstrating contradictory thinking, and changing the required response. A Violence Interrupter who has a relationship with an individual involved in the conflict will often “shadow” that person to ensure that the conflict does not reignite. For programs with hospital partnerships, Hospital Responders meet in the emergency room with the highest-risk individuals and their families and friends, in addition to coordinating with Violence Interrupters in the field, to prevent further violence and monitor the situation.

Change the Behavior of the Highest Potential Transmitters

Cure Violence employs Outreach Workers as behavior change agents. Outreach Workers work with the highest-risk individuals in the community to convey a message of rejecting the use of violence and assist them in obtaining needed services, such as job training and drug abuse counseling. They build relationships in the community through canvassing the target area, organizing community activities, holding shooting responses, and conducting community walks; then they use these relationships to identify who is at highest risk for involvement in violence. The level of risk for an individual is determined by a set of criteria that was established during preimplementation and is used to determine whether an individual is a candidate for the intervention.

Each Outreach Worker builds a caseload of high-risk participants who agree to take part in the program. Within the first 3 months, each Outreach Worker should have 10 to 20 high-risk participants who have been cleared by the outreach supervisor as being at high enough risk to qualify for the program. Outreach Workers then begin a dialogue, create buy-in, and build rapport with those at highest risk by explaining the program and the potential role the Outreach Worker and others within the community can play in their lives.

Outreach Workers start work with the participants by using some basic principles, including maintaining confidentiality, adopting a nonjudgmental approach, and meeting the participant “where they are.” Outreach Workers create a risk reduction plan for each participant that maps out the issues that the participant faces and the steps that will be taken to reduce his or her risk and uses specific messages and specific resources in the community that can help the participant with their issues. Outreach Workers meet with participants several times a week, including at critical times of need, to develop a relationship, address issues, and work on changing behaviors.

The behavior change work is centered in cognitive behavioral interventions, which target both thought and behavior for change. Underlying this work is the understanding that thoughts, feelings, and behavior are interrelated—thoughts affect behavior and experiences shape thoughts. Using this understanding, Outreach

Workers challenge violent thoughts one by one. Outreach Workers also help participants in other areas of their lives, such as education, employment, drug treatment, housing assistance, leaving a gang, and family counseling. Although dealing with these issues is separate from behavior change, such issues are very much connected to risk for violent behavior.

Change Community Norms

To create lasting change, communities much change the norms that accept and encourage violence. The Cure Violence model uses multiple messengers of the same new norms so that messages are consistently and abundantly heard. Canvassing efforts bring messages about rejecting violence directly to community members' doors, where workers spread the word about the campaign and recruit persons to work with local coalitions. Workers also establish relationships with service providers to educate them about the unique challenges faced by program participants and urge providers to accept referrals. Shooting responses are held at the site of a shooting or killing within 72 hours of its occurrence, with the goal of changing norms through public statements that shootings are an unacceptable behavior that can and must be changed. Community activities bring residents together to show their support for and interest in a safe, nonviolent community.

Cure Violence deploys a public education campaign that uses the media, messaging, and other organized communication activities to discourage the use of violence. The specific materials for these communications and the methods for dissemination are provided through the Cure Violence technical assistance team and are modifiable such that local programs can include local information. Materials are disseminated during canvassing, responses, and activities, as well as through local churches, businesses, and organizations.

Cure Violence also uses small group sessions to address norms. These sessions involve discussion with the intent of disposing of negative norms and creating new positive norms to replace them. The Cure Violence team performs an assessment of the community to determine which groups of people will need to be involved in these small group sessions, but typically they include significant others and families of participants, elderly residents, and key stakeholders. The sessions can also include skill-building components that seek to give participants basic skills in de-escalation and in changing the norms of others in their community.

Data and Monitoring

Data and monitoring are used with each of the components of the Cure Violence model to measure and provide constant feedback to the system. Violence Interrupters record information on all mediations and keep daily logs that report on other

activity. Outreach Workers record information on their participants, including the assessment at intake, the risk reduction plan, and general case notes that record their work on changing behaviors. For the norm change component, reports are kept for all community activities, shooting responses, and the dissemination of public education materials. Additionally, programs obtain information on violence in the community from local law enforcement and hospitals, so that a site can determine the progress of its work and make any needed adjustments. All of the data are used at weekly staff meetings to evaluate and update the strategy and to coordinate workers.

Maintaining an Effective Program

A central characteristic of the Cure Violence model is the use of credible messengers as workers. Credible messengers are individuals from the community in which the program is located who are trusted and have access to the people who are most at risk of perpetrating violence. This type of credibility allows access to individuals and communities that can lead to the types of conversation and participation needed to achieve positive outcomes. Because Cure Violence workers have access and trust, they are able to talk about violent behavior credibly and persuade high-risk individuals to resist behaving violently. Intensive and very specific training is required, but hiring the right workers is essential to get the access, trust, and credibility required for the job—as for all health workers attempting to access hard-to-reach populations of any type. The approach should also be implemented by a credible partner organization in the target community that has a proven track record for positive work and well-established relationships with key organizations and local leaders.

Although the credible workers and organizations are essential, it is equally important that the model is implemented as designed and that the workers are trained in the specific techniques of the model. To ensure that the program stays on model and responds appropriately to problems, Cure Violence provides extensive technical assistance, including weekly calls, quarterly booster trainings, site visits, sustainability and scaling planning, and, potentially, embedded technical assistance staff at the site when needed.

The Applications of the Cure Violence Health Approach

Cities around the world have turned to the Cure Violence Health Model to prevent many types of violence—from community violence to sectarian violence to prison violence. As of the writing of this paper, the Cure Violence approach has been implemented in more than 100 communities across 16 countries. At the local level,

all Cure Violence programs are implemented by local organizations that have been carefully trained by Cure Violence.

In the United States, the program is currently implemented in 25 cities. In New York City, an extensive program has been implemented across 20 communities and includes hospital response programs and comprehensive support services for clients and workers. In Chicago, where the Cure Violence model was first implemented in 2000, the program has been implemented in as many as 18 community areas. Recent budget cutbacks in 2015 that extended through most of 2017 resulted in all but one program site closing down and coincided with an epidemic increase in violence that nearly doubled the rate of shootings and killings. Funding has recently been restored, and the model is now being implemented in ten community areas and four hospitals. Programs are also being implemented in Baltimore, Camden, Durham, New Orleans, San Antonio, Kansas City, Philadelphia, and several cities across the state of New York.

Outside the United States, the Cure Violence approach has expanded into several areas of Latin America, the Middle East, and Africa. In Latin America, early success in Juarez and Chihuahua in Mexico, with a 50% reductions in killings in sites in Juarez, has led to plans being made for expansion of the model in both cities, as well as for possible expansion to Mexico City. Programs in Honduras and El Salvador continue to show strong results, with a recent study showing 88% reductions in shootings and killings in communities in San Pedro Sula, Honduras (Ransford et al., 2017). Additionally, the program is being implemented in communities in El Salvador, Trinidad, Jamaica, Columbia, and Argentina, and initial work to implement the model is being done in Guatemala and Brazil.

In the Middle East, Cure Violence partnered in Israel with the Salam Institute to create a network of 25 trainers and Violence Interrupters from the cities of Hebron, Bethlehem, Nablus, Tulkarem, Qalqiliya, Jenin, and Jerusalem. These individuals were trained in the Cure Violence approach to interrupting violence and in skills related to nonviolent communication. In addition, the trainees implemented projects designed to put into practice what they had learned. Combined, they interrupted over 100 incidents during a period of less than 1 month and trained an additional 200 youth and adults in the Cure Violence approach.

Other efforts in the Middle East include implementation of a reintegration program in Morocco to prevent violence among individuals returning from fighting in wars in the Middle East, as well as trainings on Cure Violence methods in the region to enable those trained to proactively mediate conflict and promote peace building in their localities. Previously, from 2008 to 2013, the Cure Violence program was implemented in Basra and Sadr City in Iraq, in partnership with the American Islamic Congress (AIC) in Iraq, and resulted in close to 1000 interruptions, and over 14,000 people reached through outreach activities.

In Africa, since 2012 the Cure Violence program has been implemented in the Hanover Park community in Cape Town, South Africa, with the local partner

Violence Prevention through Urban Upgrade. Data from the program site have shown reductions in violence that are much greater than in surrounding communities. Trainings have also occurred in Nigeria and Kenya.

Evidence of Impact of Cure Violence Approach

The Cure Violence model has been independently evaluated multiple times, with each evaluation showing large, statistically significant reductions in gun violence. In New York City, the John Jay College of Criminal Justice Research and Evaluation Center conducted an extensive, independent evaluation of the Cure Violence program that showed a reduction in violence, a shift in norms, and an improvement in police-community relations. The evaluation found a 37% to 50% reduction in gun injuries in the two communities examined. Additionally, the study found a 14% reduction in attitudes supporting violence (with no change in controls) and an increased confidence in police and increased willingness to contact police (Butts & Delgado, 2017).

An independent evaluation of the Chicago intervention sponsored by the US Department of Justice and conducted by Northwestern University concluded that the Cure Violence intervention led to reductions in shootings of 41% to 73%, reductions in shooting hot spots of up to 40%, and the elimination of retaliation killings in five of eight communities. The study additionally found that 84% of the participants met the criteria for being at high risk to be the victim or offender of a gun crime and 87% of participants received the help they needed in terms of finding employment, leaving a gang, getting assistance for drug abuse, obtaining an education, and other needs. Participants ranked Cure Violence Outreach Workers second only to parents as important adults in their lives upon whom they could rely (Skogan, Harnett, Bump, & DuBois, 2009).

An independent evaluation of the Baltimore intervention by Johns Hopkins University showed significant reductions of 34% to 56% in shootings or homicides across four communities, as well as evidence of norm change. The Baltimore study also demonstrated that communities that implement the model with greater fidelity are able to achieve greater reductions (Webster, Whitehill, Vernick, & Parker, 2012). An evaluation of the program from 2012 to 2013 in Chicago found a 31% reduction in killings in the two target districts (Henry, Knoblauch, & Sigurvinsdottir, 2014). Other studies have been conducted, as summarized in Table 5.1, and several others will be released soon, including studies of programs in Philadelphia and Port of Spain, Trinidad. Additionally, beyond the impact of the Cure Violence approach on levels of violence, the approach has also been shown to help the highest-risk persons in the community with employment, education, parenting, and many other areas of their lives and to have positive effects on children in the communities served, as summarized in Table 5.2.

Table 5.1 Findings on the impact of the Cure Violence Health Model on violence

| Location | Statistical findings | Reference/data |
|----------------------------------|---|--|
| <i>North America^a</i> | | |
| Baltimore (USA) | Up to 56% reduction in killings up to 44% reduction in shootings evidence of norm change on violence | Webster et al. (2012) Police data and surveys |
| Baltimore (USA) | 25% reduction in shootings across five sites (highest reduction, 43%) | Webster (2016) Police data |
| Baltimore (USA) | 43% of the attitudes on violence improved | Milam et al. (2016) Survey |
| Chicago (USA) | 41%–73% reduction in shootings and killings 100% reduction in retaliations | Skogan et al. (2009) Police data |
| Chicago (USA) | 31% reduction in killings 19% reduction in shootings | Henry et al. (2014) Police data |
| Chicago (USA) | 50% reduction in reinjury | Salzman et al. (2010) Hospital data |
| Chicago (USA) | 48% reduction in shootings | University of Chicago (2015) Police data |
| Chicago (USA) | 67% reduction in shootings in first community Average 42% reduction in shootings across first five communities | Ransford, Kane, Metzger, and Quintana (2010) |
| Halifax (Canada) | Reductions in shootings and violent crimes (not quantified) | Ungar and Brisson (2016) Unpublished police data and interviews |
| Kansas City (USA) | 52.6% reduction in killings 5% reduction in shootings | Watson-Thompson, Jones, and Taylor (2014) Police data |
| Kansas City (USA) | 16% reduction in total violent incidents 42.1% reduction in killings 4% reduction in shootings | Watson-Thompson, Jones, and Taylor (2015) Police data |
| New Orleans (USA) | 47% reduction in shootings victims 85% reduction in retaliations/argument motive 44% reduction in shooting reinjury | City of New Orleans (2016) Progress Report Police and hospital data |
| New York City (USA) | 37% to 50% reduction in gun injuries 63% reduction in shootings evidence of norm change on violence | Delgado et al. (2017) Hospital data High-risk survey |
| New York City (USA) | Increased confidence in and willingness to contact law enforcement | Butts and Delgado et al. (2017) High-risk survey |
| New York City (USA) | 20% lower rates of shooting > 100 mediations involving >1000 people | Picard-Fritsche and Cerniglia (2013) Police data |

Table 5.1 (continued)

| Location | Statistical findings | Reference/data |
|---|--|---|
| New York City (USA) | 18% reduction in killings vs. 69% increase in control | Butts, Wolff, Misshula, and Delgado (2015) Police data |
| Philadelphia (USA) | 30% reduction in shootings | Roman, Klein, Wolff, Bellamy, and Reeves (2017) Police data |
| <i>Latin America/Caribbean (LAC)</i> | | |
| Juarez (Mexico) | 50% or more reduction in killings in 2016 in most areas, with overall reductions in killings in 2015 and 2016 | Mesa de Seguridad y Justicia de Ciudad Juarez (2017) Official unpublished data |
| Juarez (Mexico) | Reduction in perceived number of disputes and conflicts | Del Barrio a la Comunidad (2016) Surveys and observatory unpublished data |
| Kingston and Montego Bay (Jamaica) | 60 workers trained, results forthcoming | Cure Violence (2018) Unpublished data |
| Loiza (Puerto Rico, USA) | 53% reduction in killings | Cure Violence (2018) Unpublished police data |
| Port of Spain (Trinidad) | 67% in woundings and attempted murders 33% in calls for persons armed with firearms | Maguire (2017) Police data |
| Quezaltepeque, Nejapa, Los Novillos, La Divina, La Taqueria (El Salvador) | 20 workers trained, results forthcoming | Cure Violence (2018) Unpublished data |
| San Pedro Sula (Honduras) | 88% reduction in shootings and killings 1 site, 17 months without any shootings, Over 1000 conflicts mediated | Ransford et al. (2018) Site reported data |
| <i>Middle East/North Africa (MENA)</i> | | |
| Basra and Sadr City (Iraq) | Almost 1000 interruptions More than 14,000 people reached through outreach | Cure Violence (2018) Unpublished data |
| Bethlehem, E. Jerusalem, Hebron, Nablus/Jenin | 25 workers implementing projects and spreading the methods in 4 communities | Cure Violence (2018) Unpublished data |
| Syria | 133 Syrians trained 70% reported interrupting violence in first 3 months | Cure Violence (2018) Unpublished data |
| <i>Africa</i> | | |
| Cape Town (South Africa) | 14% reduction in killings 29% reduction in attempted killings 10% reduction in serious assaults | Ransford et al. (2018) Police data |

(continued)

Table 5.1 (continued)

| Location | Statistical findings | Reference/data |
|--------------------------------------|--|---|
| Kenya [election violence] | Low levels of election violence (2013; compared with all other elections) | Cure Violence (2018) Unpublished data |
| Morocco [reintegration program] | 3 trainings conducted | Cure Violence (2018) Unpublished data |
| Nigeria | 1 training conducted | Cure Violence (2018) Unpublished data |
| <i>Europe</i> | | |
| County of Kent (UK) [prison program] | 51% reduction in overall violence 95% reduction in group attacks 44% reduction in adjudications (discipline) | Ransford et al. (2018) Unpublished prison data |

^aCaribbean and Latin American countries are listed separately from North America

Table 5.2 Other impacts of the cure violence health model

| Area | Impact summary | References |
|------------|--|--|
| Children | Peaceful mediation of conflicts with children present (18% of conflicts) | Cure Violence (2018) Unpublished data |
| | 87% of clients report home visits, 53% assistance to family members | Skogan et al. (2009) |
| | Assistance to younger siblings and children of clients | Ransford, Cruz, Decker, and Slutkin (2015) |
| | New norms to protect children; improvement of behavior toward children | Ransford et al. (2015) |
| School | 45% of clients helped to complete school/GED | Cure Violence (2018) Unpublished data |
| | Students less likely to fight | Ransford et al. (2015) |
| | Assistance in managing conflicts | Ransford et al. (2015) |
| Employment | Assistance for job preparedness (resumes, applications, practice interviews) | Skogan et al. (2009) |
| | Assistance with job readiness: 87% helped to prepare for a job interview; 86% helped to find a job opening; 82% helped to prepare a resume | Skogan et al. (2009) |
| | 72% of workers connected clients to job programs at least once a month | Skogan et al. (2009) |
| | 63% of workers helped clients get state IDs at least once a month | Skogan et al. (2009) |
| | Among clients receiving assistance, 52% were later working | Skogan et al. (2009) |
| | 64% of workers connected clients to job interviews at least once a month | Skogan et al. (2009) |

Table 5.2 (continued)

| Area | Impact summary | References |
|---|---|--|
| Parenting | 27% of clients needed help with family conflict and 15% of clients needed parenting help; over 90% reported that their needs were met | Skogan et al. (2009) |
| | 95% of clients thought that cure violence made them a better parent | Ransford et al. (2015) |
| Mentoring | “One striking finding of the interviews was how important [cure violence] loomed in their lives; after their parents, their outreach worker was typically rated the most important adult in their lives” | Skogan et al. (2009) |
| | “Many of these clients emphasized the importance of being able to get in touch with their outreach workers at critical moments in their lives—Times when they are tempted to go back on drugs, get involved in illegal forms of employment, or when they felt that violence was imminent” | Skogan et al. (2009) |
| Other assistance provided to highest risk | 89% to 99% of clients got help with a variety of personal problems (dealing with emotions, enrolling in rehab for drug or alcohol problems, getting tested and treated for STDs, finding a place to live, leaving a gang, resolving family conflict, and getting an education) | Skogan et al. (2009) |
| | 31% of participants mediated their own conflict because of cure violence | Cure Violence (2018) Unpublished data |
| Norms | Community norms changed to reject use of violence | Delgado et al. (2017) |
| | High-risk individuals report being more likely to call and feel they can count on police | Butts and Delgado et al. (2017) |
| | Changed attitudes on use of violence among highest-risk individuals | Webster et al. (2012) |

Conclusion

Violence is one of the most pressing global issues. It not only causes injury and death but also erodes the physical, psychological, social, and economic health and development of nearly everyone in affected communities, reducing life expectancy, inflicting trauma, limiting opportunity and achievement, and further entrenching inequities. These extensive effects make it absolutely necessary to address violence as a *first* step toward global progress. As we do with all other epidemics, we must immediately support investments in effective preventive methods.

When we acknowledge violence as an epidemic health problem that is transmitted through exposure and mediated by the brain and social processes, we understand that it can be effectively prevented and treated with health methods. This scientifically grounded understanding of violence holds potential for a fundamental shift in how violence and persons who show symptoms of violence are treated. Recognition

and treatment of violence as a health crisis is long overdue. To date, the health sector and health professionals have been highly underutilized for the prevention, treatment, and control of violence.

The issue of lethal violent behavior is much broader, deeper, and more specific than the current law enforcement, gun control, and mental health debates allow. If these areas represent the limit of our response, that response will be ineffective, because these areas fall short of conveying to the public how violence is formed, maintained, and changed. Violence can be successfully diagnosed, criteria can be developed and refined to predict it, and people can be successfully and humanely treated to become less violent. Effective solutions must be based on this scientifically grounded understanding of the violent behavior of an individual as an acquired and preventable event, which society has the *responsibility* to prevent. That prevention includes reducing the exposure, transmission, and progression of violence in individuals' brains and in communities through the use of community-based and health system-based outreach methods that are also used for epidemics and diseases that spread. This approach has been shown to be effective for several types of violence and has the potential to be effective for many other types of violence (Table 5.3).

The Cure Violence Health Model has shown strong and consistent evidence of effectively reducing violence in communities around the world. The model is a health approach with guidance from health professionals, but by employing workers from the same populations that are being served, the model is centered in the community, for the community, and by the community. This structure elevates the community as the main actor in preventing violence. The community is empowered by the health sector through the provision of a curriculum and skills, tools, and protocols that help to ensure effectiveness.

Beyond health approaches implemented in communities and hospitals, many other components of the system play a critical role, including teachers, law enforcement, several parts of the youth and social sector, and the media. These other stakeholders have key roles in spreading the health understanding of violence and its causes, providing effective solutions, and—to the extent they are able—screening and providing appropriate referral for treatment of people heavily exposed to vio-

Table 5.3 Syndromes of violence where the health approach is (or could be) helpful

| Syndrome of violence | Shown to be contagious | Shown to be prevented using health approach |
|------------------------|------------------------|---|
| Community | + | + |
| Cartel | + | + |
| Tribal/sectarian | + | + |
| Partner | + | (+) |
| Child | + | (+) |
| Ideologically inspired | + | (+) |
| Mass shootings | + | (+) |
| Suicide | + | + |
| War | + | (+) |

lence. In many instances, each of these stakeholders and others have already been incorporating health-based principles and approaches, and our hope is that this discussion further encourages collaboration and even more use and adaptations of health approaches by all sectors to help produce an even healthier and safer society.

Massive reductions in other serious behaviors and problems have been achieved with public health methods. Violence can be reduced to much lower levels in our communities—perhaps even to rare events—when we take the time to understand, explain, and treat it as a health issue by activating and organizing the health lens, sector, system, and partners to better prevent it.

Clinical Pearls

- Violence fulfills the criteria of a contagious disease—it spreads, clusters, and transmits between individuals.
- The health perspective of violence recognizes that people doing violence, as well as those who have been affected through injury and exposure, essentially have a personal health problem—a problem of exposure, contagion, and trauma or pain.
- The Cure Violence Health Model addresses violence by detecting and interrupting the transmission of violence, changing the behavior of the highest potential transmitters and changing community norms.
- A central characteristic of the Cure Violence model is the use of credible messengers as workers—individuals from the same communities who are trusted and have access to the people who are most at risk of perpetrating violence.

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Chapter 6

Workplace Violence in Trauma Care



Sara Scarlet and Elizabeth B. Dreesen

Case

A 43-year-old man is involved in a high-speed motor vehicle collision. He is brought to the trauma bay from the scene by emergency medical services personnel. En route, his vital signs are within normal limits, with the exception of mild hypoxia. On arrival, he is sitting upright on a stretcher and does not have a cervical collar in place. The team begins their evaluation. During initial assessment, he refuses to lay flat on the stretcher or to wear a cervical collar. He is tachycardic, and his blood pressure is within normal limits. When a nurse attempts to draw blood, the patient forcibly grabs the nurse's wrist to prevent him from completing the procedure. He continually yells at the team to stop. The attending trauma surgeon attempts to calm the patient down so that the evaluation can be completed. When she gets close to him, however, he spits in her face.

The trauma attending decides to intubate the patient. After successful placement of the endotracheal tube, the trauma team completes their evaluation. The patient is found to have multiple rib fractures and a large pneumothorax, for which a chest tube is placed. He is urgently transported to the surgical intensive care unit. When the patient's family arrives, the trauma team learns that he has a history of post-traumatic stress disorder (PTSD) and traumatic brain injury (TBI) from the Iraq War.

The attending trauma surgeon returns to the emergency department several hours later to assess another patient. The nurse involved in the case approaches her

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and states that he intends to complete an incident report regarding the patient's violent behavior. The attending cites the patient's history of PTSD, TBI, and hypoxia due to pneumothorax and suggests that the patient probably did not intend to harm anyone.

Introduction

Trauma surgeons regularly care for victims and perpetrators of violence. In 2015, for example, nearly 10% of adult patients cared for in US trauma centers were injured by assault (American College of Surgeons, 2016). A significant body of research by trauma surgeons addresses this violence and explores the identification, prevention, and risk factors of violent injury in the USA.

Violence and violent injuries are not limited to the communities outside trauma centers and other hospitals. Recent, well-publicized assaults on medical personnel have reminded us that health-care providers are also targets of violence within the seemingly safe environments of hospitals and other health-care facilities (Ellis, Levenson, & Prokupecz, 2018).

Despite these recent assaults, the trauma surgery community has yet to explore or acknowledge workplace violence. As of February 2018, there were no publications in the *Journal of Trauma and Acute Care Surgery* or the journal *Trauma* related to workplace violence. We trauma surgeons are not alone in overlooking this aspect of our work. Despite increasing interest in surgeon well-being, wellness, and burn-out, little has been published on workplace violence elsewhere within the surgical context. Neither *JAMA Surgery* nor *Annals of Surgery* contains a single publication on the topic of workplace violence.

Why is there almost no discussion of workplace violence in the surgical literature? The existing literature in both medical and occupational health journals posits a variety of explanations. There is no “gold standard” definition of workplace violence, for example, and this leads scholars to struggle as they review both the literature and publicly available data. Even in settings where workplace violence is more clearly defined, it is often underreported (Arnetz, 2015). Additionally, as physicians and caregivers who work in a helping profession, many of us feel that experiencing some level of violence as we care for patients is “just part of the job” (Pompeii et al., 2016). Even many of those who seek to remedy violence in the workplace fail to formally report incidents, which reduces the ability of institutions to address safety concerns (Pompeii et al., 2016). Finally, reporting systems are not standardized within health-care institutions, again contributing to a dearth of reliable data.

In this chapter, we will review existing definitions and the epidemiology of workplace violence in health care. We will assess the potential impact of workplace violence on patient care and health-care workers and will discuss ethical issues raised in the context of workplace violence. Finally, we will suggest ways in which trauma surgeons can respond constructively to this issue.

Definitions

The definition of violence is culturally determined, and it tends to change over time (Krug, Dahlberg, Mercy, Zwi, & Lozano, 2002). “Wife-beating,” for example, was legal in all states until 1850, when Tennessee became the first state to outlaw it (Pleck, 1989). The term “domestic violence” originally referred to civil unrest and rioting, and it was not until the 1970s that it started to be used in reference to partner abuse. Often, the behaviors that individuals perceive as violent vary depending on the context. For example, when an efficient surgical team quickly removes dressings on morning rounds, patients may experience it as a form of assault, wishing they had been allowed to remove the dressing at their own pace.

The World Health Organization (WHO) has broadly defined violence to include “the **intentional** use of physical force or power, threatened or actual, against oneself, another person, or against a group or community, that either results in or has a high likelihood of resulting in injury, death, psychological harm, maldevelopment, or deprivation” (Krug et al., 2002). The WHO definition includes elements of intentionality, both physical and verbal threat, and consequences ranging from the physical to psychological (Krug et al., 2002).

In the USA, workplace health and safety are the responsibility of two separate governmental agencies: the National Institute for Occupational Safety and Health (NIOSH), which is a part of the CDC and is primarily a research organization, and the Occupational Safety and Health Administration (OSHA), which is part of the Department of Labor and is a regulatory agency tasked with creating and enforcing workplace safety regulations. NIOSH defines workplace violence as “violent acts, including physical assaults and threats of assault, directed towards persons at work or on duty” (National Institute for Occupational Safety and Health, 2014). NIOSH and OSHA do *not* incorporate intent into the definition of workplace violence. In accordance with this definition, harms inflicted by demented, delirious, or mentally ill persons (even those ultimately found “not guilty by reason of insanity”) are included in the category of workplace violence.

The WHO and NIOSH definitions of violence both focus not only on physical assault but also on the verbal threat of assault. A significant body workplace violence literature, however, considers denigrating, demeaning, or abusive language to be a form of workplace violence as well (Pompeii et al., 2016). These differing definitions have made it difficult to consolidate and compare data on workplace violence in health care.

Workplace violence is categorized by the relationship of the perpetrator to workers and the workplace (Table 6.1) (Phillips, 2016). The bulk of research related to workplace violence in health care addresses type II violence, or violence in which the perpetrators are patients or individuals who have relationships with patients (family and friends). Type II violence accounts for greater than 90% of *reported* incidents of workplace violence in health care (Phillips, 2016). Herein, we will focus on type II workplace violence. We have chosen to focus on this form of workplace violence given its frequency and because of the unique ethical dilemmas that arise when people in need of medical care are perceived as violent.

Table 6.1 Types of workplace violence (Phillips, 2016)

| Type | Relationship of perpetrator and workplace |
|------|---|
| I | None |
| II | Current or previous patient (or patient support person) |
| III | Current or previous employee |
| IV | In a personal (versus professional) relationship with an employee |

Epidemiology

In 1970, the Occupational Safety and Health Act was implemented. The act was meant “[t]o assure safe and healthful working conditions for working men and women; by authorizing enforcement of the standards developed under the Act; by assisting and encouraging the States in their efforts to assure safe and healthful working conditions; by providing for research, information, education, and training in the field of occupational safety and health” (Occupational Safety and Health Administration, 2016a). Although OSHA has made important gains in the prevention of infection and unintentional injuries, it has paid relatively little attention to the recognition of and response to workplace violence in any occupational sectors, including health care. Today, for example, NIOSH recommends, but does not require, that all hospitals create workplace violence prevention programs, including worksite analysis and recordkeeping to define the scope of the problem at each institution (National Institute for Occupational Safety and Health, 2014).

The Joint Commission is an independent, not-for-profit organization in the USA with the mission “[t]o continuously improve health care for the public, in collaboration with other stakeholders, by evaluating health care organizations and inspiring them to excel in providing safe and effective care of the highest quality and value” (The Joint Commission, 2018). Although The Joint Commission does have policy requirements regarding workplace violence, they have been described as “vague” and “open to interpretation” (Phillips, 2016).

In the absence of specific criteria for assessing and preventing violence, the response of health-care facilities and health systems has been variable. This is evident in the published literature, much of which consists of single institution studies that measure violent incidents, often with unvalidated survey tools. Most investigators rely on their own definitions of violence, making institutional estimates difficult, if not impossible, to compare. Furthermore, the majority of the existing literature is dedicated to the study of workplace violence in settings known to be high risk (i.e., emergency rooms and psychiatric wards). As a result, the prevalence of workplace violence in other areas of health care is poorly understood. Still, it is useful to review some of this literature.

A review of national data suggests that health-care workers are at high risk for experiencing violence in the workplace. In fact, according to the 2016 National

Crime Victimization Survey, the majority of individuals who were the victim of a crime at their place of work were medical professionals (US Department of Justice, Office of Justice Programs, Bureau of Justice Statistics, 2017). Of the 24,000 workplace assaults that occurred in the USA between 2011 and 2013, 75% occurred in health-care settings (Phillips, 2016). According to the Bureau of Labor Statistics, while 20% of all work-related injuries in the USA occurred among health-care workers, they experienced 50% of all workplace assaults (Occupational Safety and Health Administration, 2016a).

The 2017 Healthcare Crime Survey, conducted by the International Association for Healthcare Security and Safety (IAHSS), examined crime rates for 222 US hospitals during 2016 (IAHSS Foundation, 2017). The study used FBI definitions of ten crimes relevant to hospitals. The rates of disorderly conduct, assault, and violent crime (murder, rape, robbery, and aggravated assault) were 34.1, 9.3, and 1.0 per 100 beds, respectively (IAHSS Foundation, 2017). During the same time period, the rates of assault and aggravated assault, both type II incidents, were 1.4 and 0.7 per 100 employees, respectively (IAHSS Foundation, 2017).

In perhaps the largest detailed survey of type II workplace violence in health care, Pompeii et al. (2016) studied staff at two large health systems in Texas and North Carolina and found that 39% of respondents had experienced at least one episode of type II violence in the preceding year. Studies suggest that type II violence is more commonly experienced in specific contexts, such as the emergency department (Phillips, 2016). A recent study of 65 emergency medicine training programs found that 78% of faculty and resident trainees had experienced workplace violence during the past year (defined as verbal threats, physical assault, confrontation outside of the workplace, or stalking) (Behnam, Tillotson, Davis, & Hobbs, 2011). A separate study of 147 staff members at an urban emergency department indicated that 88% had experienced violence within the past 6 months (defined as verbal abuse, physical violence, threats, sexual innuendo/groping, grabbing, spitting, name calling, or threat of lawsuit) (Copeland & Henry, 2017). Another study of nurses in emergency departments found the majority had experienced violence in the form of verbal (100%) or physical (82.1%) assault within a 1-year period (May & Grubbs, 2002).

There are almost no data on trauma surgeons' experiences with violence; however, the experience of other health-care professionals working in the trauma context may provide insight into the experience of trauma surgeons. In-depth interviews with nurses practicing in trauma centers note perceived inadequacy of safety measures and a heightened sense of vulnerability (Catlette, 2005). In the only study of its kind, a 1997 survey of 475 US surgical residents found that 280 had witnessed a physical attack on a colleague, and 179 reported experiencing violence themselves (Barlow & Rizzo, 1997). Consistent with the known risk factors for violence, the majority of incidents occurred in the emergency setting, although the authors do not specify whether the residents were involved in trauma care or not (Barlow & Rizzo, 1997). Of note, residents reported violence perpetrated by patients, patient family members, and colleagues (Barlow & Rizzo, 1997).

Problems with Estimates

Although these statistics are alarming, many believe that incidents of workplace violence are underreported (Arnetz et al., 2015). A 2015 study noted that among health-care providers who experienced an episode of workplace violence, only 12% completed a formal report (Arnetz et al., 2015). Pompeii et al. (2016) assessed reporting of type II violence among health-care workers and found that, although a majority of staff reported incidents, less than 10% used established reporting systems. Instead, the majority of staff reported incidents to co-workers and unit managers (Pompeii et al., 2016). These individuals often had variable recommendations for staff who had experienced violence. There was a tendency for others to encourage reporting of events regarded as “bad” or “significant,” although it was unclear which events would meet these criteria (Pompeii et al., 2016). Some managers were unaware of how to report incidents (Pompeii et al., 2016). Interestingly, one quarter of staff who had experienced type II violence documented the event in the electronic medical record with the goal to “protect themselves rather than seek support from their employer” (Pompeii et al., 2016).

Failure to report is multifactorial. As previously mentioned, varying perceptions regarding what constitutes violence may be contributory. Certain violent acts, such as physical assault or those resulting in physical injuries, may be reported more frequently because of the need for compensation or health benefits. The study by Pompeii et al. (2016) on type II workplace violence identified lack of physical injury, verbal versus physical assaults, lack of patient intent, and the perception that violence is “part of the job” as the most common reasons why staff failed to report incidents. The notion that workplace violence is somehow “part of the job” is a predominant theme in the literature (Arnetz et al., 2015; Copeland & Henry, 2017). Staff may have little faith in reporting systems or be too overextended to report incidents (Phillips, 2016). They may avoid reporting acts that they believe could misrepresent patients or be stigmatizing and may wish to avoid legal implications for patients, such as investigation or prosecution by law enforcement. Finally, nurses cite the impact of the “patient as customer” claim on their willingness to report (Pompeii et al., 2016). Some nurses fear that reporting would result in punishment and express concern that the emphasis on patients as customers would lead the nurses themselves to be blamed in some way for some of the reported incidents (Arnetz et al., 2015; Pompeii et al., 2016).

What Factors Increase the Risk of Violence?

According to OSHA, “pain, devastating prognoses, unfamiliar surroundings, mind- and mood-altering medications, drugs, and disease progression can all cause agitation and violent behaviors” (Occupational Safety and Health Administration, 2016a). Trauma surgeons will note that the majority of our patients are subject to

these factors. Patients with mental illness, those under the influence of alcohol or drugs, and those with dementia are also more likely to behave violently (Levenson, 2011). Certain clinician characteristics, e.g., female gender and small stature, may also be associated with an increased risk of experiencing violence (Koukia, Mangoulia, Papageorgiou, Gonis, & Katostaras, 2014). Not surprisingly, the duration of patient contact is proportional to the risk of violence, and, as a result, nurses, nursing aides, and “sitters” tasked with observing patients experience the highest rates of workplace violence (Phillips, 2016). In a survey of 41 hospital “sitters” across six US hospitals, 76% had experienced type II violence within a 1-year period. Incidents were categorized as physical assault (61%), threat of physical assault (63%), and verbal abuse (73%) (Schoenfisch et al., 2015). Even nurse managers and administrative staff with less patient contact can be targets of violence, however, because they are often asked to intervene in problematic circumstances (Pompeii et al., 2016). Violence varies across hospital settings, and emergency rooms and psychiatric facilities have high rates of violence (Occupational Safety and Health Administration, 2016a).

Other factors that increase the likelihood of workplace violence include:

- Working with people who have a history of violence or who may be delirious or under the influence of drugs
- Lifting, moving, and transporting patients
- Working alone
- Poor environmental design that may block vision or escape routes
- Poor lighting in hallways or exterior areas
- Lack of means of emergency communication
- Presence of firearms
- Working in neighborhoods with high crime rates
- Lack of training and policies for staff
- Understaffing in general and especially during meal times and visiting hours
- High worker turnover
- Inadequate security staff
- Long wait times and overcrowded waiting rooms
- Unrestricted public access
- Perception that violence is tolerated and that reporting incidents will have no effect

Effect on Care

Workplace violence instills fear among staff members and has an impact on patient care that goes beyond the impact on an individual injured worker. In a systematic review of the effect of workplace violence on health-care workers, Lanctôt and Guay (2014) identified consequences of workplace violence in the following domains: physical, psychological, emotional, work functioning, relationship with

patients/quality of care, social/general, and financial. Staff who are fearful of patients may spend less time caring for them. Violent patients may be restrained or chemically sedated, which can lengthen their recovery process, and “sitters” or one-to-one nursing may infringe on their privacy (Levenson, 2011). Family members and other visitors who behave violently may be refused entry to health-care facilities, even if these individuals often offer support to patients and may even have been assisting with elements of clinical care, such as personal hygiene and reorientation in case of delirium. Outside of the emergency setting, violent behaviors may prompt physicians to terminate the doctor-patient relationship. For patients who have reduced access to health-care services, doing so may eliminate their only means of receiving health care.

Having been labeled as violent in the past may have serious implications for patients, subjecting them to bias and stigma (Wong, 2017). In a practice known as “diagnostic overshadowing,” clinicians may overlook important clinical complaints in patients who have been deemed violent or uncooperative, attributing the complaints to drug seeking or mental illness (Joy, Clement, & Sisti, 2016).

Experiencing workplace violence also influences clinician health and well-being. In a systematic review of type II workplace violence in health care, Pompeii et al. (2013) found that victims reported anger, irritation, fear of returning to the workplace, humiliation, and self-blame after experiencing violence. Affected individuals can experience acute or post-traumatic stress and anxiety (Dement, Lipscomb, Schoenfisch, & Pompeii, 2014). Kansagra et al. (2008) showed that among physicians, residents, nurses, nurse practitioners, and physician assistants at 65 US emergency departments, one quarter reported feeling safe sometimes, rarely, or never while at work. In the study, nurses were five times less likely to feel safe than other staff members (Kansagra et al., 2008). Perception of safety was not associated with the number of attacks personally experienced, which suggests that exposure to violence, even indirectly, may make staff feel unsafe at work. Experiencing violence is also associated with attrition from the workforce. In the field of nursing, for example, violence has been described as “a major factor in the ... retention of registered nurses” (Jackson, Clare, & Mannix, 2002, p. 14).

Responding to Workplace Violence

Although The Joint Commission and OSHA recommend a structured institutional program that addresses workplace violence, many hospitals do not have an effective one (Phillips, 2016; US Government Accountability Office, 2016). In the absence of a robust program involving prevention, training, and education, and an organized tiered response to violence, individual caregivers—the most frequent targets of workplace violence—must rely on their own skill set to limit violence and address the personal sequelae of having been the target of violence.

Individual Responses

Health-care providers responding to workplace violence primarily rely on communication and medication. Verbal threats and abuse can sometimes be addressed by calm, empathic communication or de-escalation techniques (Levenson, 2011). Some clinicians develop management plans (colloquially referred to as “contracts,” although these documents are not true legal documents), which may include written expectations for behaviors in the health-care setting (Wyatt, Anderson-Drevs, & Van Male, 2016). In our experience, the use of these management plans is highly variable. Studies regarding their effectiveness are limited.

Chemical restraint (most often antipsychotic medication) is typically used when violence is associated with mental illness, delirium, and traumatic brain injury, although there is very limited high-quality literature to direct specific medication choices (Levenson, 2011). Physical restraints are also used in these circumstances. Psychiatrists sometimes intervene by imposing seclusion, although this is not realistic for medically ill patients. Trauma surgeons, however, are more likely to escalate the medical response to intubation and sedation, particularly in the trauma bay when the urgent need to diagnose traumatic injury is impeded by violent behavior of unknown etiology.

While many health-care providers have received training in the medical and surgical management of delirium, few—other than psychiatrists—report specific training in de-escalation or other means to address workplace violence. In a systematic review of assault on residents, Kwok, Ostermeyer, and Coverdale (2012) cite a curriculum for psychiatry residents but report that only 30% of the non-psychiatry residents surveyed had received any violence-related training and that residents suggest refresher courses in risk assessment and de-escalation, among other things. In the absence of such training, workplace violence may lead clinicians to use their power to punish patients for behaving violently. We are aware of clinicians punitively restricting pain medications, including local anesthesia and narcotics, and we have witnessed arbitrary room reassignments as a form of punishment.

Caregivers’ responses to the experience of violence vary. As suggested above, many simply continue working. Some report the events through formal reporting channels. More, it appears, use informal “reporting,” i.e., they discuss the events with colleagues or inform charge nurses, nurse supervisors, and others with authority, including residency program directors and the patients’ physicians (Kwok et al., 2016; Pompeii et al., 2016). In some cases, caregivers press criminal charges.

Interestingly, many nurses appear to document violent behavior in the medical record (Pompeii et al., 2016). Nurses report doing this both to “tell their side of the story” and to prepare future caregivers for the potential of violence (Pompeii, 2016). Other clinicians prepare for potential violence differently. In a study of 177 emergency medicine physicians in Michigan, Kowalenko, Walters, Khare, et al. (2005) noted that “42% of emergency physicians sought various forms of protection, including obtaining a gun (18%), a knife (20%), or a concealed weapon license (13%) and carrying mace (7%) or a club (4%).”

The long-term individual responses to violence are poorly documented. Experiencing violence is clearly identified as a risk factor for attrition (Jackson et al., 2002). In a systematic review of the effects of workplace violence on staff, Lanctôt and Guay (2014) noted that although workplace violence was associated with “psychological consequences (e.g., symptoms of posttraumatic stress disorder, depression, anxiety) and negative emotional consequences (e.g., anger, fear, and sadness),” less than 10% of victims sought counseling. Dement et al. (2014) noted that experiencing type II workplace violence was associated with increased employee prescription claims for antidepressants and anxiolytics, but not with health claims for the treatment of depression and anxiety.

Ideal Institutional Response to Workplace Violence

Ideally, an institutional response to workplace violence is comprehensive and includes staff education, prevention, incident management, centralized reporting platforms, and post-incident support. OSHA recommends, but does not require, that employers develop and implement workplace violence prevention programs (Occupational Safety and Health Administration, 2016b). In 2016, OSHA published guidelines for establishing and maintaining such programs; it recommends that programs include “(1) management commitment and employee participation, (2) work-site analysis, (3) hazard prevention and control, (4) safety and health training, and (5) recordkeeping and program evaluation” (Occupational Safety and Health Administration, 2016b). While OSHA does not require health-care facilities to have prevention programs, it can issue citations for safety concerns, although it does not currently have a mechanism in place to track institutions’ responses to citations (US Government Accountability Office, 2016). In 2016, the US Government Accountability Office (GAO) issued a report on workplace violence prevention and current OSHA practices for enforcing workplace safety within health care (US Government Accountability Office, 2016). The report identified several areas for improvement with regard to current OSHA practices. Additionally, the report reviewed evidence supporting the use of violence prevention programs and described it as “limited.” Only five publications evaluating the effectiveness of prevention programs met criteria for review, but four of these five publications suggested that prevention programs do reduce workplace assaults (US Government Accountability Office, 2016). Overall, the GAO called for improved reporting mechanisms, more research on program effectiveness, and more robust follow-up by OSHA at institutions cited for safety concerns (US Government Accountability Office, 2016).

In our view, an ideal response to workplace violence uses the least restrictive means of ensuring safety. Some interventions are directly implemented by the health-care team (i.e., de-escalation, medications, supervision), while others are implemented at the institutional level (i.e., structural changes, changes in unit staffing). Some circumstances will necessitate the involvement of law enforcement. Many strategies for responding to workplace violence limit patient autonomy, but

the risk-benefit profile of interventions is generally viewed as permissible when their effect on safety outweighs associated harms.

Institutions' Responses to Workplace Violence

Institution-sponsored training is an important element of the response to workplace violence. Kowalenko et al. (2012) recommend that training includes strategies to recognize individuals who may become violent, de-escalation techniques, and non-violent interventions in crises and emphasizes the importance of involving other professionals, such as law enforcement, early on. It is unknown how many health-care facilities use such training programs. Studies have shown that certain professionals at high risk of experiencing violence, such as "sitters," receive little training on how to appropriately respond to safety concerns (Schoenfisch, 2015).

All staff should be aware of the definitions of workplace violence used by their employers. Clear definitions of workplace violence and criteria for incident reporting can help reduce bias and ensure that staff report concerns through appropriate channels. In order for incident reporting platforms to be successful, however, staff must be educated in their use. Incident reporting platforms must be easily accessible and enable quick reporting by busy staff and should be uniformly adopted throughout the health-care system. Staff should be educated that such platforms do not trigger an immediate punitive response, but rather a proper investigation of the incident.

Regular communication and engagement with law enforcement, such as hospital police, is necessary because it allows institutions to respond appropriately to violence and to reserve punitive responses for specific scenarios, thereby ensuring that such responses are just. Law enforcement officials are not typically trained in how to work with violent people who are ill. Techniques that are successful outside of health-care settings (e.g., escalation in force) may be inappropriate and harmful in scenarios such as behavioral health emergencies. It is essential that health-care institutions educate and collaborate with law enforcement officials who work in health-care settings and will be called on for assistance.

Workplace violence in health care is best managed by multidisciplinary teams "trained in the fundamentals of violence risk and threat management" (Wyatt et al., 2016, p. 1038). This model has been adopted by the Veterans' Administration (VA), which has a robust "violence risk assessment and management system" (Hodgson, Mohr, Drummond, Bell, & Van Male, 2012). The VA's strategy for managing workplace violence involves the use of "disruptive behavior committees" (DBC's), which include "mental health, safety, general counsel, police and security, ethics, and patient representatives" (Hodgson et al., 2012, p. 1010). In a study of 140 VA hospitals by Hodgson et al. (2012), DBC's were generally regarded as effective by Chiefs of Staff. Perceived program effectiveness was associated with reduced rates of workplace assault. Importantly, DBC's develop recommendations for care in the form of patient treatment plans that may include "known triggers, restrictions on the

gender of providers, or mandates for the presence of police accompaniment” (Hodgson et al., 2012, p. 1010). Threat assessments and treatment plans are documented uniformly in the EMR, which is nationally available (Hodgson et al., 2012). Importantly, the VA ensures that flags (notifications in the EMR) are used to guide health care and are not for use by hospital administration or law enforcement (Hodgson et al., 2012).

The current evidence on strategies to prevent and mitigate workplace violence is limited (Phillips, 2016). Program effectiveness is difficult to demonstrate for many reasons, including challenges related to defining workplace violence, underreporting, unique features of institutions, and the specific scenarios in which violence occurs. We have compiled a list of potential strategies for responding to violence and organized the strategies into five domains: clinical care; structural design; hospital policies and procedures; law enforcement and the criminal justice system; and staff support (Table 6.2); however, we acknowledge that this topic deserves further study.

Table 6.2 Interventions to prevent, identify, and respond to workplace violence

| Domain | Example strategies |
|--|---|
| <i>Clinical care</i> | De-escalation techniques Physical restraints Chemical restraints Supervision (i.e., “sitter”) Chaperoned interactions (avoid one-on-one) Seclusion Discharge/transfer Documentation in the electronic medical record Care management plans |
| <i>Structural design</i> | Locked, badge-in units Metal detectors Barriers between patients/visitors and workers Adequate lighting Mirrors Security cameras Clearly marked, easily accessible exits Duress alarms |
| <i>Hospital policies and procedures</i> | Policies with clear definitions of what is recognized as violent behavior Regular inspection and safety evaluation of patient care areas Termination of the doctor-patient relationship Refused entry to facilities Encouraging individuals to leave against medical advice Limits to visitation (# per patient) |
| <i>Law enforcement and the criminal justice system</i> | Regular police presence in high-risk areas Assistance with filing charges |
| <i>Staff support</i> | Mandatory education and training Post-incident debriefing Centralized, user-friendly incident reporting platforms Safety planning |

The Trauma Surgeon's Perspective

As trauma surgeons, we often care for patients who have experienced extremes of violence; however, we may also be subjected to significant violence ourselves. According to Wassell (2009, p. 1053), “health care workers who treat individuals experiencing a life threatening or life-altering crisis are clearly at risk for assault and other types of violence.” Although the literature on trauma surgeons’ experiences is scant, the high prevalence of violence in emergency settings suggests that we too may experience high rates of violence.

Since trauma surgery became a surgical specialty nearly 50 years ago, trauma surgeons have been dedicated to injury prevention. In recent years, trauma surgeons have worked to identify, prevent, and treat interpersonal violence in communities, as with the creation of hospital-based violence intervention programs.

We believe that these collective experiences provide trauma surgeons with a unique perspective on violence. As a result, we are poised to make significant contributions to the prevention and management of violence in the health-care setting. We have a responsibility to our patients, our colleagues, and ourselves to address this violence. And who better to lead this effort than trauma surgeons, individuals who work in spite of great uncertainty, who take charge in times of duress, and who work to protect the needs of the vulnerable?

Future Directions

The definition of workplace violence put forth by the NIOSH does not incorporate intentionality. This has significant implications in the setting of trauma care because many of the people we care for have conditions that influence their decisional capacity. Health-care professionals who attribute patients’ behaviors to illness or view them as a means of coping with illness may be unlikely to report these behaviors as violence; however, these attitudes may reduce the likelihood that health-care facilities are able to respond to safety concerns or ensure that staff who are harmed are offered the resources they need.

Health systems must monitor harms experienced by health-care professionals and encourage them to report them. Given the punitive and potentially stigmatizing nature of labeling a person as violent, coupled with the uncertainty regarding intent, we suggest an alternative label. We believe that OSHA’s current definition refers to *workplace harms* rather than workplace violence, which we believe to be a subset of workplace harms. Changing the language in this way may facilitate reporting and thus improve institutional responses to such behaviors.

In addition to more thoughtful definitions, more research on trauma surgeons’ experience of workplace harms and violence is needed. Exposing high-risk settings and scenarios can facilitate proper allocation of resources and the development of preventive efforts. We must study strategies for mitigating violence and ensure that such techniques are taught to *all* members of trauma teams. We should identify specific people on trauma teams who are at risk and particular situations and

physical positions in the trauma bay that are risky and then include risk assessment in our trauma team training and risk prevention in our team leadership. Debriefing, an important aspect of trauma care, should also include an evaluation of safety.

Conclusion

Workplace violence has the potential to influence medical care, create or exacerbate inequities in this care, and threaten the well-being of clinicians and patients alike. It is important for trauma surgeons—individuals well versed in the prevention and recognition of violence and response to it within communities—to be attuned to this form of violence as well.

Caring for patients who threaten our safety is incredibly difficult. Ethical dilemmas arise when our sense of duty as clinicians is challenged by safety concerns. Some have described this as a “patient-care paradox,” or “the simultaneous need to protect this particularly vulnerable patient population while incurring direct threats to personal safety” (Wong, Combellick, Wispelwey, Squires, & Gang, 2017, p. 228). We cannot assume, however, that such risks are “part of the job.” Conversely, we cannot allow workplace violence to prevent us from delivering the care that our patients require, especially in the emergency setting. Instead, we must respond to violence with research, engagement, education, and structural change.

According to Maslow’s hierarchy of needs, without a sense that one is safe, it is not possible to attain one’s full potential, or “self-actualization” (Maslow, 1943). If we do not feel safe as clinicians, how can we properly care for others? If our patients do not feel safe in our care, how can they truly heal? Without safety, there is no health. Therefore, we must address workplace safety in health care.

Clinical Pearls

- Workplace violence is common in health care. Although there is literature on the experiences of emergency medicine professionals with workplace violence, there are no similar data describing the experience of trauma surgeons.
- Trauma surgeons receive little to no training on how to respond to workplace violence. To identify and treat potentially life-threatening injuries, trauma surgeons often must resort to more restrictive means of controlling violent behaviors (i.e., sedation and intubation) than would be appropriate in other settings.
- Patients who are violent in health-care settings can create challenges and safety concerns for the clinicians who care for them. Patients who behave violently may be subjected to poor quality health care, and diagnostic overshadowing can occur. Clinicians recognize the difficulties of balancing their duty to care for violent patients with their own personal safety, a phenomenon known as the “patient-care paradox.”
- We have an ethical responsibility to protect ourselves, our colleagues, and our patients.

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Part II
Ethical Issues Related to Trauma
and Trauma Surgery

Chapter 7

Geographic Information Systems in Trauma Research



Marie Crandall

Origins of Mapping in Medicine

Mapping traumatic injuries can allow researchers to identify geographic and sociodemographic risk factors for particular types of injuries. Geographic information systems (GIS) provide a platform to analyze the data and inform potential solutions.

In most ancient civilizations with a recorded tradition of medicine and public health, relationships between human health and the environment have been described since the time of Hippocrates. The German physician Leonhard Finke in 1792 created a disease map to help practitioners understand the incidence and spread of infectious diseases, all at a time when germ theory was not fully accepted (Musa et al., 2013). But perhaps the most famous example of early uses of mapping in medicine and public health was the case of the Broad Street pump in London (Crandall, Zarzaur, & Tinkhoff, 2013). In summer 1854, an outbreak of cholera occurred in the Soho area of London that took the lives of several small children. Dr. John Snow began to investigate these cases by interviewing families and mapping the cases of cholera in the area. Dr. Snow's investigation revealed that the majority of cases occurred in close proximity to the Broad Street pump, from which families in the area drew their drinking water. He also noted that the nearby cesspool, or waste and sewage receptacle, was leaking, contaminating the water in the Broad Street pump. Dr. Snow then petitioned local authorities to remove the handle from the pump at Broad Street. After the removal of the pump handle, cases of cholera dramatically decreased. This was likely the first recorded example of how mapping was successfully used to intervene in a disease process to prevent further illness.

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What Are Geographic Information Systems?

GIS often refers to the academic field of study that analyzes spatial information. It is frequently used in engineering, transportation and logistics, telecommunication, and business. As noted above, it can also be useful in medicine. In medicine, studies based on GIS are known as GIS or medical geography studies. In GIS, multiple variables can be mapped onto many layers, including details such as space in three dimensions, longitudinal data, and neighborhood characteristics (often referred to as “attribute data”). The location data can be as granular as an address or even exact geographic coordinates, or more general, such as zip code or geographic region. When address data are entered by hand, errors can be introduced, and it becomes very important for researchers to closely inspect the data for spelling errors, imprecision, transposition of numbers, and other issues, to ensure optimal mapping. When coordinates can be auto-uploaded, such as with some prehospital transport or law enforcement data, the locations are less subject to error, but these are costlier options, and available programs may not be universally compatible (Foote & Lynch, 2014).

The attribute data may include such things as median income, ethnic and racial demographics, local business, green spaces, and other aspects of both the built environment and the local community. These patient-, community-, and regional-level characteristics add to the richness of the data set and to the ability to both describe and analyze geographic differences.

GIS analysis has become much more accessible because of significant advances in mapping software. Some are desktop based and free, and others are proprietary. Many academic institutions use common licenses, and the software can be accessed for free with academic credentials. The software has the ability to overlay multiple maps with address data, geographic boundaries (such as streams and rivers), built environment (such as roads and bridges), and attribute data, among other things. The maps can be arranged and rearranged to enhance particular details. In addition, geographic regression analysis can be performed to better understand the independent and interdependent effects of multiple variables on a particular outcome of interest.

Geographic Information Systems in Injury-Related Research

It makes intuitive sense that GIS would be ideal for studying injury. Given the unique aspects of local speed limits, traffic patterns, pedestrian-friendly walkways, proximity to waterways, and other geographically specific factors, mapping can be extremely useful for injury analysis and prevention (Cockings & Martin, 2004).

The ability to precisely identify the injury location and residential address of victims makes it possible to correlate information about the preinjury environment and the location of the injury with the rich data available in GIS. Areas where

certain types of injuries occur more frequently than expected can be identified with GIS techniques. An early example of the use of GIS in injury research was a study in the 1990s that mapped injuries occurring in Hartford, Connecticut, in people aged ≤ 20 years and found two injury “hot spots” for pedestrians hit by cars. The investigators then worked with local government officials to employ traffic calming measures, pedestrian walkways, and other methods to reduce injuries (Braddock et al., 1994). A more recent study in Florida used geospatial mapping to identify areas of pediatric pedestrian injuries, demonstrating that they occurred with a high frequency in the densely populated urban core, an area that was and remains also more socioeconomically stressed (Weiner & Tepas 3rd, 2009). The authors then proposed preventive efforts, including pedestrian education, traffic law enforcement, and parental involvement, in addition to environmental modification, highlighting the complex interplay between patient and environmental factors.

Mapping has also been used to identify high-risk areas for other types of injuries, such as burns. Investigators in Utah discovered seven counties with a very high per capita risk of burns and with potentially modifiable risk factors, such as cooking over open flames, methamphetamine preparation, and space heaters (Edelman, Cook, & Saffle, 2010). These issues were brought to state and local attention as public health risks.

Geographic Information Systems and Trauma Systems

Trauma systems are organized, coordinated services for the injured patient comprising prehospital transport and trauma centers that follow protocolized trauma care. It is well established that trauma systems are associated with improved mortality from serious injury (Mackenzie et al., 2006) and that geographic areas with a higher concentration of trauma centers experience lower injury mortality rates (Brown, Rosengart, Billiar, Peitzman, & Sperry, 2016). Because of this, GIS is quickly becoming an integral part of trauma systems planning, both to ensure optimal access to care and also to develop locoregional injury prevention strategies. The Canadian (Hameed et al., 2010) and Scottish (Jansen et al., 2015) health care systems have used GIS to help improve trauma systems planning and care provision, demonstrating that these systems are feasible and may help inform policy. The American College of Surgeons has advocated for designating trauma centers on the basis of system need, taking into account a variety of factors, including population density, per capita incidence of injury, and local resources.

Although trauma centers and trauma systems are associated with improved mortality after injury, because they provide specialized, expedited trauma care, it has not been clarified whether all patients benefit equally or whether the impact could be measured in an urban trauma system with generally short transport times (Feero, Hedges, Simmons, & Irwin, 1995; Newgard et al., 2010).

Geographic Informaion Systems and Chicago Trauma Systems

In 2010, an 18-year-old anti-violence and fair housing advocate named Damien Turner was shot while playing basketball at a park in south Chicago; he was not the intended target. His injury occurred a few blocks from the University of Chicago Medical Center, but this was not a trauma center, so he was transported to the nearest one, Northwestern Memorial Hospital, 10 miles away, where he could not be saved. His injuries were catastrophic and likely not survivable, but the long transport time suggested the possibility of a geographic effect of transport times on survival from gunshot wounds (GSWs). To study this, our group first examined the effect of prehospital transport times on the outcome of patients who were stabbed or shot over a 5-year period in Chicago and brought by the emergency medical system (EMS) to local trauma centers. We found that if patients had signs of severe injury, as manifested by low blood pressure, they were up to 13 times more likely to die if they experienced long transport times (Swaroop et al., 2013). We did find that the most severely injured patients were transported the most quickly, a testament to the seasoned Chicago EMS. What this study could not tell us, however, was the effect of distance from a trauma center on mortality because we found that transport times were relatively uniform, despite uneven distances, and that most of the calculated prehospital time differences were attributable to time spent on the scene or response times (Swaroop et al., 2013).

To address these concerns, we analyzed 11 years of data for nearly 12,000 GSWs in Chicago. We found little variation in time spent on the scene and response times, but considerable variability of transport times. Mean transport time, however, was higher for those shot more than 5 miles away from a trauma center (16.6 minutes versus 10.3 minutes, $p < 0.001$); unadjusted mortality was also higher for these patients (8.7% vs 7%, $p > 0.001$), as was risk-adjusted mortality (OR 1.23, 95% CI 1.02–1.47, $p = 0.03$) (Crandall et al., 2013). Using GIS mapping, we were able to demonstrate that the areas of the city that were further from trauma centers overlapped with the more socially distressed south and southeast sides of the city, creating “trauma deserts” that experienced less access to immediate care for potentially life-threatening, penetrating injuries (Fig. 7.1). Finally, we wanted to determine whether the addition of another trauma center on the south side of the city could impact prehospital transport time disparities. To this end, we compared pediatric and adult GSW transport times and found that in many areas of the city, in these trauma deserts, over 25% of adult prehospital transport times exceeded 30 minutes (Wandling, Behrens, Hsia, & Crandall, 2016). However, the University of Chicago has remained a Level I Pediatric Trauma Center for decades, and, with the presence of a southeast Chicago trauma center, we did not observe prolonged transport times for pediatric trauma patients (Wandling et al., 2016).

Regarding trauma care in a large urban environment, these studies demonstrated access disparities that were potentially impacting survival from GSWs. The work was considered pivotal in discussions with the city, state, and local institutions about

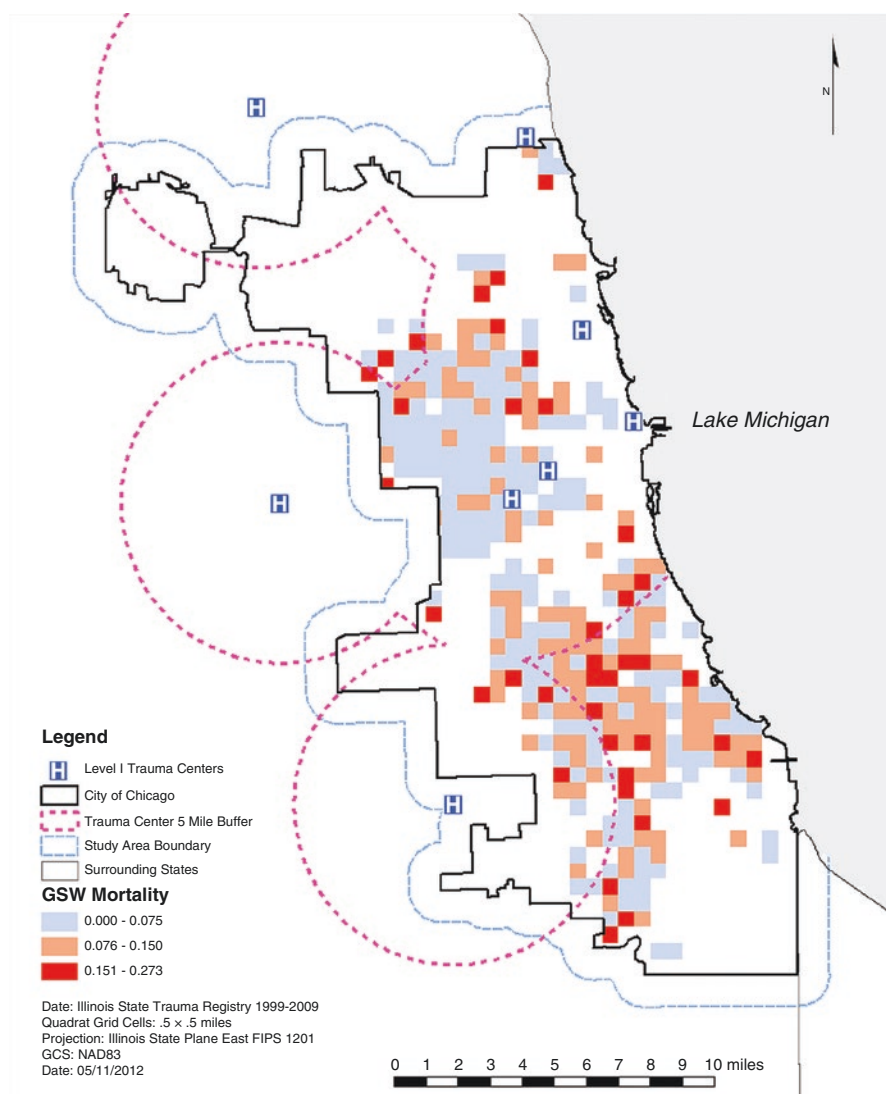


Fig. 7.1 Trauma deserts and gunshot wound (GSW) mortality in Chicago. (Reprinted from Crandall et al., (2013), Sheridan Content Solutions)

optimal trauma systems planning moving forward. Chicago activists also cited our findings when discussing concerns about these disparities. These data may have partially impacted institutional change: In September 2015, the University of Chicago announced that it was planning to open a level I trauma center at its Hyde Park campus. In the ensuing 2 years, strong leaders and clinicians were hired to create this center, which opened in May 2018.

Geographic Information Systems, Trauma Research, and Social Justice

The example of GIS research influencing changes in Chicago trauma systems demonstrates the capacity for mapping in trauma research to address health disparities or other social justice issues. In other work, our group demonstrated the association between proximity to an establishment with a liquor license and GSW incidents: We found an up to 500-fold increase in some areas, even controlling for underlying rates of GSWs; however, this association was only found in certain neighborhoods, underscoring the hyperlocal nature of GIS work (Crandall, Kucyala, Behrens, Schwulst, & Esposito, 2015). The neighborhoods where these associations were found were more likely to be communities of color and socioeconomically depressed, which makes potential solutions challenging. As we noted in our article, however, although one solution may be closure of liquor stores or rezoning, this may have unanticipated consequences. A store that sells liquor may also be the sole purveyor of fresh produce, dairy items, or quick meals in a community with few businesses. These businesses may also have strong community followings and may serve as a community gathering place. Any proposed solutions must engage community members, city leadership, and the business community to ensure that all the facts are considered.

In a study to determine the effects of trauma center closures on local communities, we compared trauma mortality rates in Los Angeles in the zip codes served by the Martin Luther King Hospital (MLK). MLK closed in 2007 after several years of high-profile problems related to patient outcomes and quality. However, it was the only level I trauma center for a population of over one million people in South Central Los Angeles, which included the socioeconomically distressed neighborhoods Compton and Watts, neighborhoods that had been plagued by violence for several decades. We found that mortality from most types of trauma was unaffected by the closure, but mortality from GSWs increased in the areas served by MLK (Fig. 7.2) (Crandall, Sharp, Wei, Nathens, & Hsia, 2016). While Los Angeles County had gone to great lengths to prevent adverse consequences due to the closure of MLK, including opening a level II trauma center at an established hospital in a nearby community, for GSW patients this did not seem to completely offset the effects of MLK's closure. With these findings, we proposed that greater consideration be given to the effect on local trauma patients if a hospital closure includes closure of a trauma center.

Gun violence in particular is increasingly understood to be a public health problem, but it is also an issue of structural violence (Zakrison, Puyana, & Britt, 2017). Structural violence is defined as social structures that put individuals in harm's way, such as poverty, substandard housing, poor educational systems, or a dangerous built environment. Gun violence disproportionately affects the poor and people of color; these are also the communities most affected by poverty and discrimination. GIS mapping, with its ability to overlay multiple variables of deprivation and disadvantage in a visual fashion, may be more impactful than text or tables. By allowing users

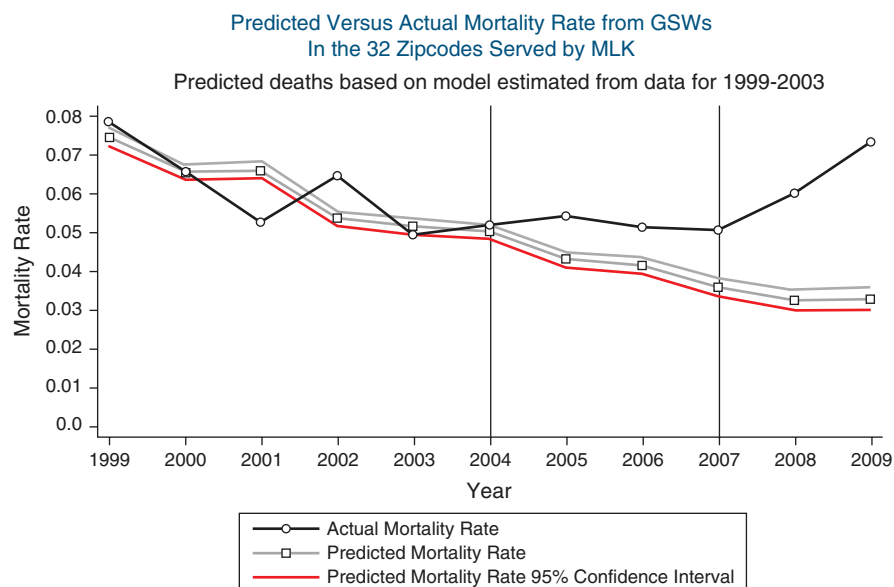


Fig. 7.2 Effect of MLK closure on mortality from gunshot wounds (GSWs). MLK: Martin Luther King Jr. Hospital. (Reprinted from Crandall et al., (2016), copyright 2016, with permission from BMJ Publishing Group Ltd.)

to map neighborhood assets, such as businesses, nonprofit organizations, schools, and other potential stakeholders, it may suggest strategies for collaboration and social change that would not have otherwise been evident (Kirwan Joint Center, 2009).

Some researchers have used GIS to analyze high-risk areas for intentional injuries and GSWs, with the goal of informing location-specific, culturally appropriate preventive efforts in these communities (Lasecki et al., 2018; Newgard et al., 2016; Smith et al., 2017). With respect to endemic gun violence, using maps rather than dry text may help make much more evident the understanding that change will require real community investments to help decrease the impact of poverty; institutionalized racism; poor schools; and disparities in access to health care, child care, and other social justice-related causes. Finally, as GIS analysis and geographic regression techniques become more robust, we may continue to gain a deeper understanding of the relationships between geography, the built environment, sociodemographics, and other local risk factors in general to help inform prevention efforts.

Ethical Implications

The genesis of this chapter was a lecture given as part of the University of Chicago MacLean Center for Clinical Medical Ethics and University of Chicago Trauma Center 2017–2018 Lecture Series on Ethical Issues in Violence, Trauma, and

Trauma Surgery. Lectures in this series focused on topics such as palliative care in trauma, violence as an infectious disease, and violence prevention efforts locally and across the country. GIS research may have less obvious ethical implications than some of these other topics. However, there are several issues that are worthy of discussion, which I will mention here.

First, to what extent is it ethical for research findings to be used to address issues of social justice that may have real community implications? For example, community activists were aware of our research project on the association between pre-hospital transport times and mortality for GSWs in Chicago. It was an incendiary issue, and we felt intense pressure not only to finish the work but also to interpret the findings. However, because of the politicized nature of the issue, in particular the community pressure on the University of Chicago to become a trauma center, we were very cautious to never overstate our findings. We had found that longer transport times were associated with death from GSWs and that certain disadvantaged areas of the city were experiencing access disparities to trauma center care for life-threatening GSWs, but we acknowledged that this did not necessarily imply that the addition of another trauma center would be the only solution. That being said, all of us who worked on this research applauded the decision for the University of Chicago to become a trauma center. We recognize that this was intensely planned and well thought out by the university administration and medical school, and we believe that it has the potential to make a marked difference in the area, not just for trauma patients. It also signals an investment in the community with respect to jobs, emergency general surgical care, and the research, outreach, and prevention efforts that are concomitant with establishment of a trauma center.

Second, the research I have done with my co-investigators frequently has implications for effecting change, such as rezoning and changes in hospitals participating in a trauma system and local injury prevention strategies. However, none of my work has truly been community-based, participatory research in the sense of shared decision-making, with stakeholder input in all phases of the work. I like to think that our work still has value, but it is possible that some studies might have been more impactful if stakeholders had been involved at all phases of the research. Alternatively, if there are preconceived expected outcomes from research, the possibility of bias might not be as plausibly deniable; for example, if community activists had participated in our “trauma deserts” study, their focus on the University of Chicago becoming a trauma center may have influenced our interpretation of the results, or it may have been seen to do so. In any case, it is important to consider the ethics of research that may impact communities.

Finally, with respect to GIS itself, privacy and confidentiality may be an issue. Data can be as granular as local addresses, but this level of granularity is seldom accessible or compatible with privacy regulations. Plottable variables, such as schools, clique activity, gentrification zones, and others, may have hyperlocal effects within neighborhoods, and access to very specific addresses and locations could provide invaluable information. This conflict has not yet been addressed in the GIS literature and is one that has yet to be completely resolved.

Conclusion

In summary, geographic information systems have been an incredibly powerful tool in trauma research, and study results have the potential to effect real change. However, some ethical issues exist, such as implications for inclusion of community members and confidentiality and privacy concerns.

Clinical Pearls

- Geographic information systems (GIS) are useful tools in public health and medicine.
- Mapping injuries can help identify local risk factors and posit potential solutions.
- As the field of GIS grows, ethical issues may become increasingly relevant considerations.

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Chapter 8

Palliative Care in Trauma: Violence and the Ethic of Care



Anne C. Mosenthal and Franchesca J. Hwang

To look in the face of humanity and not turn away is the most spiritual thing one human being can do for another. –Albert Camus

Introduction

The growth of the hospice and palliative care movement in the last 20 years has increased the focus on how we die in America. Simultaneously, attention to waste and cost in healthcare and the concept of value have provided more reasons to embrace palliative care. These reasons, coupled with changes in demographics, aging of the baby boomers, and the realization that many are living well into their 90s with long-standing serious chronic illness, have turned our attention not only to end-of-life care but also to “how to live well until the end,” as Atul Gawande said (Gawande, 2014). Palliative care has traditionally been a response to the illness trajectory and end-of-life concerns for patients with cancer or end-stage organ failure related to cardiovascular and neurodegenerative diseases, which are leading causes of death among elderly Americans. For these disease trajectories, palliative care focuses on quality of life and the preferences of patients with serious illnesses and a slow decline of health, often over years, that ultimately leads to death. However, for those populations who more frequently die from injury or violence, especially the young, little attention has been paid to provision of end-of-life care. Furthermore, trauma survivors have great need for palliative care to maximize

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function and quality of life for themselves, their families, and communities. Although firearm homicide in the United States has decreased over the last decade (Planty & Truman, 2013), it remains a major public health crisis because it is the leading cause of death in young black males under the age of 35. Whereas unintentional injuries are the predominant cause of death in young white males, homicide is responsible for almost half of deaths in black males between the ages of 15 and 24 years and is the second leading cause of death in young Hispanic males (Centers for Disease Control and Prevention, 2015). These disparities in death by violence are further accentuated by the lack of access to palliative care and understanding of the particular trajectory of illness related to violence and its impact on family and community. The questions how, when, where, and whether to provide palliative care for those affected by violent injury raise significant ethical issues related to justice, autonomy, and the ethic of care. This chapter will explore these issues, raise ethical questions, and provide a framework and guidance on the appropriate palliative care.

Clinical Case

The following clinical case exemplifies the issues of palliative care in trauma:

A 23-year-old man was brought to the emergency room in extremis after sustaining multiple gunshot wounds. The shooting occurred during a robbery, for which the patient was a suspect. He was unconscious and in shock when he arrived in the trauma bay. He was immediately intubated, resuscitated with a massive blood transfusion protocol, and taken to surgery. He underwent multiple exploratory laparotomy procedures for vascular and bowel injuries and was found to have a complete spinal cord injury. A long and protracted course in the intensive care unit (ICU) ensued; he had multiple complications, surgeries, infections, and sepsis and was ventilator dependent for 3 months. Early on, it was determined that he had permanent quadriplegia, as well as short bowel syndrome, and would require 24-hour care along with parenteral nutrition for the rest of his life. Discussions among the healthcare team focused on issues of futility, long-term access to care, and whether the patient could survive outside an ICU. Yet survive he did, and similar discussions about goals of care took place with his sister and his significant other, with whom the patient had two little children. Each discussion revealed that the patient's wishes were to live as long as possible, regardless of his quadriplegia and expected quality of life. He developed severe neuropathy and chronic pain syndrome, which was very difficult to treat successfully. He was denied admission to inpatient rehabilitation, but his family expressed their willingness to care for him at home, despite financial and social challenges. After 9 months of a complicated hospital course, he was discharged to home with his girlfriend, requiring home parenteral nutrition. His neuropathic pain was never well controlled, despite high doses of gabapentin and opioids. He developed sacral and ischial decubitus ulcers, osteomyelitis, and sepsis and was hospitalized multiple times over the next 9 months. These problems progressed to gangrene of one lower extremity first and then the other, requiring amputation. His osteomyelitis progressed, however, with the only treatment option left being hip disarticulation. The patient refused further surgery or life support and expressed goals for comfort care, to be home with his family. He went home on hospice and died a week later surrounded by his family, 2 years after his original injury.

This case raises multiple questions and potential ethical conflicts, depending on the context of care. First, from the perspective of trauma and surgical care: Was this high-quality surgical care? Or, was this futile care because the patient clearly had a constellation of injuries that were not compatible with quality of life without intensive medical, social, and financial resources that were unavailable to him except in an ICU setting? Second, from the perspective of palliative care: Was this high-quality palliative care? Was his suffering and that of his family addressed well? Were his wishes and values respected at the end of life? Was care aligned with his goals? Is it possible to redefine palliative care in the trauma setting and create a new model of “trauma palliative care?”

Examined from an ethical framework, this case raises additional questions. Was care consistent with the biomedical ethical principles of beneficence, non-maleficence, autonomy, and justice? A different ethical construct, the ethic of care, which informs palliative care, focuses on relational ontology and the relationships between individuals and society; when viewed from this vantage point, different questions arise that include the perspective of the individual, his or her caregivers and family, healthcare providers, and the community at large. Last, if we examine this case from the perspective of society, we must consider the role of violence and its impact on the care of the patient, his family, and community. What is the role of structural violence and its impact on public health? Did this patient lack access to the best care because of social and economic barriers? Was his care unjust because of the burden it placed on society (cost), his family (caregiver burden), or healthcare providers?

The following will examine these questions through an ethical and a clinical framework, identify the barriers to trauma care after injuries, and describe a model for effective palliative care in the setting of injury.

The Ethic of Trauma Care

Trauma care is a comprehensive approach to the care of the injured across the continuum of illness, from the moment of injury to the time of recovery and rehabilitation. It includes emergency transport, resuscitation, surgery, critical care, and rehabilitation. Optimal care across this continuum is defined by the American College of Surgeons (ACS) Committee on Trauma in the “Resources for Optimal Care of the Injured Patient” (Rotondo, Cribari, & Smith, 2014). Care is provided by a multispecialty team, led by trauma surgeons. The ethic of care in trauma is primarily focused on rescue, prolongation of life, and survival. Quality of care is measured by the avoidance of preventable mortality. Death of the patient is traditionally viewed as a failure, and a peer review panel must examine each case of death to evaluate whether there are opportunities for improvement. Only recently, with the dramatic increase in elderly trauma, primarily due to falls, has a shift occurred in the ethic of trauma care to accommodate the reality that many elderly value quality of

life over quantity. In addition, long-term follow-up of the injured has revealed that poor quality of life, decreased survival, and delayed death are all sequelae of the initial injury, even years later (Santry et al., 2015).

The Ethic of Palliative Care

Palliative care is defined by the World Health Organization as “an approach that improves the quality of life of patients and their families facing the problem associated with life-threatening illness, through the prevention and relief of suffering by means of early identification and impeccable assessment and treatment of pain and other problems, physical, psychosocial, and spiritual” (World Health Organization, 2018). Other definitions emphasize that palliative care should be offered to all those with serious illness, regardless of prognosis, throughout the continuum of illness to facilitate patient autonomy, access to information, and choice. It is important to distinguish palliative care from end-of-life care or hospice care: End-of-life care or hospice refers to physical, emotional, and spiritual support provided to patients and their families who are at or near the end of life, with a terminal prognosis of 6 months or less, and palliative care refers to patient- and family-centered care provided across the continuum of a patient’s illness and includes disease-specific management and life-prolonging treatments. The best palliative care possible, therefore, depends on the wishes of each patient and family and may refer to any of the following: “to live as well as possible for as long as possible,” “to keep fighting until the end,” “to not prolong my suffering if I have no hope of recovery,” or “to die at home with my family all around.”

Palliative care in modern medicine developed from the hospice movement, which was founded by Dame Cicely Saunders, an English nurse who later became a social worker and then a physician. In 1967, she constructed the world’s first purpose-built hospice, St. Christopher’s Hospice, after the death of a close patient and her father. She described the primary goal of palliative care as the relief of “total pain” and physical, emotional, social, and spiritual pain and emphasized this concept in her teaching. As much as she emphasized patient autonomy in palliative care, Saunders highlighted a different ethic of care. She defined palliative care in a *relational* context as how it affects all concerned parties—patients, families, and society. In discussing autonomy, she said: “Our choices do not take place in a purely individual setting ... Guided by the principle that life is of value until its ‘natural’ end, with space for mending relationships, and honoring important values, by competent, ever-improving care... I believe we should constantly reiterate that this is the way to respect patients’ and families’ true needs. Their autonomy must be in the context of society as a whole” (Saunders, 1995).

The ethic of palliative care therefore highlights that dying is a natural event and part of the circle of life. This creates inherent conflicts in the setting of violence or intentional injury because by definition these are not “natural,” and this fact must be acknowledged and incorporated into all care for the patient and family. The dying

individual is part of a network of others and must be respected in that context, beyond individual autonomy. To “care” for that person is a relationship, not merely a contractual arrangement. This applies to physicians, nurses, and others who care for the seriously ill. Thus, the focus is equally on *caring* and on *prolonging life*. Caring may take many forms and includes physical, emotional, and spiritual caregiving; in the context of violence, injury, and a resultant disfigurement or disability that is impossible to ameliorate, caring may simply include bearing witness to the suffering. To care is to *not* turn away, to *not* abandon the patient or family, and to sustain focus on the personhood even when society and structural violence have not.

The ethical focus on the *relationship* in palliative care can be translated into practice in a variety of ways. This applies to the physician-patient relationship, the patient-family relationship, and the relationships of all members of the care team. Palliative care is by definition delivered by an interdisciplinary team and is mediated through excellent communication. High-quality palliative care includes high-quality communication, shared decision-making, information sharing, and acknowledgement of difficult emotions, such as loss, anger, and bereavement, that influence medical decisions.

The Palliative Care Gap

Despite the growing hospice and palliative care movement, there remains a gap between the care that patients want and the actual care they receive. For older patients with serious illness, the burden of treatment, such as long hospitalization or invasive interventions, influences their treatment preferences, and many patients would forgo treatment if the likely outcome is survival with dependence or without intact cognitive abilities (Fried, Bradley, Towle, & Allore, 2002). Similarly, when it comes to quality end-of-life care, patients believe that the following aspects are the most important: receiving adequate pain and symptom control, avoiding inappropriate prolongation of the dying process, achieving a sense of control, relieving the burden on the family, and strengthening relationships with loved ones (Singer, Martin, & Kelner, 1999). Yet many older adults have surgery, and as many as one third of Medicare beneficiaries undergo inpatient surgery during the last year of life (Kwok et al., 2011). In the setting of trauma, especially in the treatment of critically injured patients, patients’ preferences and values cannot be elicited because of the nature of trauma and its burden. Thus, family members are frequently called upon to be surrogates in the decision-making process. Often, the families’ values align with those of the patients. Family members of seriously ill patients admitted in the ICU reported that their most important value was to make patients comfortable and minimize their suffering (Heyland et al., 2015). Nonetheless, a third of family members of decedents had problems with the level of pain and pain management at the end of the decedents’ lives (Tolle, Tilden, Rosenfeld, & Hickman, 2000). Again, in many instances the values and needs of family members were not met by the care providers.

Palliative Care in Trauma

The ACS has endorsed palliative care for several decades and in 2005 issued the Statement of Principles of Palliative Care (American College of Surgeons, 2005), which underlined the importance of integrating fundamental concepts of palliative care into surgical care. The benefits of palliative care for trauma patients are apparent. A prospective observation study found that early integrated palliative care resulted in earlier consensus on goals of care and decreased the use of non-beneficial life support and ICU length of stay in dying trauma patients in the ICU, without changing mortality (Mosenthal et al., 2008). An increasing body of literature has identified the special needs of trauma patients and their families for palliative care, as well as the barriers to delivering such care. These needs are particularly acute for those injured by violence. First, injury is by definition sudden, often without warning, and most commonly in previously healthy young people. Most victims do not have advance directives, nor have they discussed wishes for their end-of-life care. If the patient's injuries are life threatening, the family are in shock, unprepared, and overwhelmed and have huge emotional and psychological needs for support and communication, especially if they are now thrust into the role of surrogate decision maker. Increasing evidence reveals that families who have had a loved one with critical illness or injury experience posttraumatic stress disorder, depression, and anxiety at very high rates, especially if the patient dies (Lautrette et al., 2007). The consequences are further exacerbated if the injury or death is the result of violence, and they can have lifelong consequences for the survivors' grief and bereavement.

The nature of traumatic injury and any consequent disability can create prognostic uncertainty, leading to difficult decision-making. Although prognosis is quite good for predicting mortality, it is relatively poor for predicting functional outcomes, such as neurologic and cognitive recovery and whether people will be dependent for the rest of their lives. Here, healthcare providers must have excellent communication skills in delivering bad news and the ability to manage uncertainty and support patients and families in these difficult decisions about care. The twin ethical obligations to tell the truth and maintain hope can be challenged when families ask, "Will he ever wake up?" or "Will she ever walk again?"

To address these barriers, the field has evolved, and palliative care principles have been adapted to the trauma setting to create an integrated model of care delivery. The ACS released the ACS Trauma Quality Improvement Program (TQIP) Palliative Care Best Practices Guidelines in 2017 with the following key messages (American College of Surgeons Committee on Trauma, 2017):

- Best practice palliative care is delivered in parallel with life-sustaining trauma care, throughout the continuum from injury through recovery.
- The unit of care is the patient and family.
- Core trauma palliative care can and should be provided by trauma center teams, even if palliative care consultation is not available.
- Optimal palliative care requires an interdisciplinary team of physicians, nurses, and psychosocial and rehabilitation providers.

- Optimal care requires trauma physicians and nurses to have basic competencies in primary palliative care, pain and symptom management, and end-of-life care.

Palliative care in trauma should begin on admission to the emergency department in parallel to resuscitation. For patients who die in the trauma bay, palliative care includes informing the family about the death in a compassionate and supportive manner, allowing them time to view the body, and observing any culturally appropriate rituals. For those who survive resuscitation, performing a palliative care screen is the next step. This includes assessing prognosis on the basis of the injury pattern, age, and frailty; eliciting any advance directives; assessing the family and social context; and beginning conversations for shared decision-making. This assessment should identify those who are likely to die in the hospital, as well as those who may survive but will have poor functional or neurologic outcome and will consequently need intensive and ongoing palliative care. This palliative care includes support for families, communication, and pain and symptom management. In all patients, pain and symptoms should start to be managed in the emergency department. Care should be aligned with the patient's preferences and goals, and, if an advance directive or expression of preferences suggests that the likely outcome or quality of life is not compatible with the patient's wishes, withdrawal of life support should be considered.

Violence and a history of violent injury can complicate palliative care in trauma. Violent injury disproportionately affects urban communities and people of color. Survivors of violence and their families may have a history of exposure to trauma, violence, and structural violence, which can affect their response to the new injury. This response may include complicated bereavement, posttraumatic stress disorder, and other mental health issues. Training and experience with trauma-informed care and knowledge on adverse childhood experiences are important to delivering palliative care in this setting.

Reframing the Questions: Quality and Ethics

If we return to the clinical case described above, rather than asking questions, i.e., “Was this high-quality surgical care?” and “Was this high-quality palliative care?”, we can ask “Was this high-quality trauma palliative care?”. The patient received all possible life-saving surgical care and intensive care, which extended his life 2 years beyond what he otherwise would have had. At the same time, all care decisions were made jointly with the patient, his surrogate, and the physicians and were aligned with his preferences to “survive at all costs.” Along the continuum of his care, many family meetings took place between his significant other, his sister, and his care team. These meetings focused on shared decision-making on treatment options, assessment of the patient's and family's values and goals, discussion about his prognosis and expectations after hospital discharge, and continuous emotional and spiritual support, all of which were provided by the staff involved in his care: the trauma

surgeons, intensivists, residents, nurses, social workers/case managers, and palliative care team. The patient's comfort and reduction of his pain were constantly emphasized throughout the care process. The goal to "survive as long as possible" was elicited from the patient himself once he was able to communicate with the care team. Despite the prolonged, complicated hospital course, he survived and accomplished his goal as a result of good trauma care and palliative care.

Examining these questions from an ethical framework is more complex. All of the care was based on the principle of autonomy; every decision was made, and all care was provided, on the basis of the patient's wishes or the interpretation of his wishes by his surrogates. However, conflicts arose on the team regarding futility, prolongation of suffering (non-maleficence), and access to care and cost (justice). While aggressive surgical care to prolong survival was compatible with beneficence, it also added to the patient's suffering because it caused pain and disability and thus was not consistent with the principle of non-maleficence. The cost to society of his care was high, and the principle of justice suggests that the burdens and benefits of care should be distributed fairly. Yet the disproportionate effect of violence on young men of color is a major public health problem and creates disparities that should be addressed with appropriate healthcare and support, even while society addresses the structural causes of this violence. Ethics and justice suggest that this is true regardless of whether the patient is viewed by society as a "victim" or a "perpetrator," and the ethic of care supports providing trauma palliative care to all who need it in this setting.

Finally, regardless of the conflicts between beneficence, non-maleficence, autonomy, and justice, the ethic of care inherent in trauma palliative care suggests that we must care for persons in the context of their community and relationships. It is the relationship *itself* that is the major component of care and healing, even when life-prolonging treatments are no longer available or when society and structural violence make them difficult. The relationship between the patient and physician is a critical part of palliative care in trauma. To quote Eric Cassel, "Recovery from suffering often involves help, as though people who have lost parts of themselves can be sustained by the personhood of others until their own recovers. This is one of the latent functions of physicians: to lend strength" (Cassel, 1982).

Conclusion

Palliative care in trauma represents the integration of multiple imperatives, including quality of care, ethics of care, social justice, and provision of care; these imperatives are based on the needs and preferences of the individual patient and their family. Violence plays a complicated role in both the delivery of quality palliative care and our foundational ethical framework. The key to palliative care in trauma is early integration of palliative care processes into resuscitation and into all trauma care throughout the continuum of the illness to rehabilitation and recovery. Because

trauma leads to diminished length and quality of life, palliative care can play a role over the long term as well. The ethic of care provides a framework and ethical construct for trauma palliative care that focuses on *caring*, alongside all other aspects of medical care.

Clinical Pearls

- Relieve pain and suffering while providing patient- and family-centered care for trauma patients.
- The patient and family are one unit of care.
- Physicians must elicit patients' values and preferences through goals-of-care discussions and respect these values and preferences.
- We must take care of patients affected by violence on both a societal and an individual level.

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Suggested Reading

- American College of Surgeons Trauma Quality Improvement Program. Palliative care best practices guidelines.
https://www.facs.org/~media/files/quality%20programs/trauma/tqip/palliative_care.ashx

Chapter 9

Geriatric Trauma Care



Jeffrey J. Skubic and Zara Cooper

Introduction

Between 2012 and 2050, the US population of adults aged >65 years is expected to nearly double to 83 million. In 2015, in the USA, medical costs attributable to falls in the elderly were estimated at \$50 billion (Florence et al., 2018). Rates of hospitalizations related to traumatic brain injury (TBI) increased by more than 50% from 2001–2002 to 2009–2010 (from 191.5 to 294 per 100,000) (CDC, 2018). Compared with younger patients, patients aged 75 years and older have the highest rates of TBI-related hospitalizations and mortality (CDC, 2018). Health-care utilization remains elevated for at least 2 years post injury in elderly patients (Carter & Porell, 2011). In 2013, 14.1% of the US population was older than age 65 (OECD, 2019). The same year, 37.9% of personal health-care spending was for elderly patients; at the rate our geriatric population is growing, caring for these patients is expected to become an increasingly larger segment of US health-care spending (Dieleman et al., 2016).

Older patients have worse in-hospital mortality after trauma than younger patients (Taylor, Tracy, & Napolitano, 2002). Mortality associated with geriatric trauma has been estimated to be as high as 15%; however, many who survive fail to return to independent living (Hashmi et al., 2014). For those who do, many experience functional declines that negatively impact their quality of life. Older,

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seriously ill patients tend to prioritize physical and cognitive function over life prolongation, so it is important to keep the individual patient's goals of care in mind when formulating a treatment plan.

Frailty

Frailty is defined as a syndrome of accelerated aging resulting in decreased physiological reserve and decreased resilience to stressors (McDonald et al., 2016). Surgery and trauma lead to major physiological changes, including fluid losses, hemorrhage, cardiovascular stress, respiratory impairments, and mental status changes. These effects are exacerbated in elderly trauma patients, who frequently have many comorbidities in addition to being frail. Although distinct from physiological aging, the incidence of frailty increases with age. Whereas 10–20% of adults aged 65 are frail, that number increases to 26–40% among patients aged 85 and older (American Medical Association, 1991; Collard, Boter, Schoevers, & Oude Voshaar, 2012). As patients age, they use more of their physiological reserves to maintain homeostasis. Therefore, they have fewer reserves to meet challenges introduced by trauma. Numerous studies have demonstrated that frailty is associated with worse outcomes after injury. Joseph et al. (2014) developed the Trauma-Specific Frailty Index, which is based on 15 variables available from the medical record. A score of 0.25 or higher has been shown to be an independent risk factor for in-hospital morbidity and mortality, as well as adverse discharge disposition (Joseph et al., 2014). In a prospective study of 188 patients, Maxwell et al. (2016) were able to show that the pre-injury scores on the Vulnerable Elders Survey-13 (VES-13, a tool that predicts functional decline and mortality) and Barthel Index (an assessment of functional independence) correlated to worse outcomes after injury.

Futility

The word “futility” comes from the Latin word *fitilllis*, which means worthless. The simplest definition of medical futility is “a clinical action serving no useful purpose in attaining a specified goal for a given patient” (Kasman, 2004). Aghabarary and Dehghan-Nayeri (2016, p. 6) proposed that the definition of futility consists of six elements:

1. The probability of achieving the physiological effects which have been supposed for a medical treatment
2. The probability of achieving the defined goals of a treatment
3. The amount of benefit and utility which the intended treatment has for the intended patient
4. The survival rate of the intended treatment
5. Post-treatment quality of life
6. The cost-effectiveness of the treatment

Determining futility in severely injured, older patients can be highly challenging. Conflicts within the care team (families, patients, and physicians) as to whether futility exists and as to the best treatment approach are not infrequent. During discussions with patients or their surrogates, attention should be focused on whether specific medical treatments may be futile under these specific circumstances. Treatment decisions must be made in the context of understanding a patient's overall health goals and willingness to make the trade-offs necessary to achieve an acceptable outcome. Clinicians are not ethically obligated to provide treatment that they believe is futile and misaligned with the patient's goals and values. The American Medical Association (AMA) has stated that physicians are not ethically obligated to deliver care that, in their best professional judgment, will not have a reasonable chance of benefiting the patient. A *reasonable chance* is very hard to define. In light of that, the AMA goes on to say, "Denial of treatment should be justified by reliance on openly stated ethical principles and acceptable standards of care...not on the concept of 'futility', which cannot be meaningfully defined" (American Medical Association, 2008). Later in their revised guidelines, the AMA has tried to expand upon that statement, saying, "Physicians must remember that it is not possible to offer a single, universal definition of futility. The meaning of the term 'futile' depends on the values and goals of a particular patient in specific clinical circumstances" (American Medical Association, 2016).

The four tenets of medical ethics are autonomy, beneficence, non-maleficence, and justice. Below, we present four clinical vignettes that illustrate how these principles relate to the care of older trauma patients.

Autonomy

Charlie is an 80-year-old retired attorney with five children and a wife of 57 years. His medical history includes diabetes, coronary artery disease, congestive heart failure, and a transient ischemic attack. Charlie was driving back from an appointment with his primary care physician when he lost consciousness behind the wheel, headed the wrong way into traffic and ended up in a head-on collision. Unresponsive at the scene, he was intubated and flown to the nearest level I trauma center. When evaluated in the trauma bay, he was found to be in shock, with a blood pressure reading of 70/40 mm/Hg, a heart rate of 65 beats per minute, a respiratory rate of 20, and an oxygen saturation of 93% on room air. His focused assessment with sonography for trauma (FAST) exam, a study which rapidly uses ultrasound in the trauma bay to look for free fluid in the abdomen, presumed to be blood, was negative. He received fluid resuscitation and was started on vasopressor therapy. He remained unresponsive and was transferred to the intensive care unit (ICU). Twelve hours later, he was finally stable enough to travel to the computed tomography scanner. The imaging demonstrated a large stroke. He remains in critical condition.

Ethical Questions

Who is his health-care agent?

How should the surrogates be coached?

The principle of autonomy states that individuals have the right to self-determination. The current legality of this principle in the USA dates back to the American Hospital Association's 1972 "Statement on a Patient's Bill of Rights" (American Hospital Association, 1973). This statement declares that patients have the right to receive considerate and respectful care and the information necessary to give informed consent for any treatment or procedure and to refuse any treatment offered. Notably, the right to demand a particular treatment is not included. Therefore, physicians must be very cautious which treatments they offer and must simultaneously ensure that they preserve patient autonomy. In a study in which 179 surrogates for 142 incapacitated, critically ill patients were interviewed, only 2% of the surrogates based their beliefs exclusively on the prognostic information given to them by the physician. Instead, 98% of surrogates relied on other factors, such as their own observations of the patient, their belief that their presence at the bedside improved the patient's prognosis, and their optimism, faith, and intuition (Boyd et al., 2010).

If patients are competent and able to participate in treatment decisions, physicians must respect their decision to accept or refuse treatment. Geriatric patients are more likely than younger patients to lack capacity because they are more likely to have cognitive impairment or dementia. When a patient does not have the capacity to make decisions, a health-care proxy or a living will may be used. A health-care proxy is a document that designates a person (health-care agent) to make decisions if a patient is unable to do so for themselves. A living will, on the other hand, is a document that outlines the patient's wishes (advance directives). The living will can be used by the health-care agent and physician to help guide decision-making. Several different approaches exist to help surrogates make decisions, especially when no living will exists. The preferred approach is substituted judgment, i.e., surrogates state what patients would have wanted if they were able to speak for themselves. If the patients' wishes are not known, surrogates should use the best-interest standard, i.e., benefits to the patient should be maximized and harmful risks minimized. Using a narrative approach, surrogates and clinicians can examine a patient's life story to make decisions that seem consistent with previous choices the patient has made for themselves (Torke, Alexander, & Lantos, 2008). In a case that received national media attention in 1976, the supreme court of New Jersey ruled that mechanical ventilation could be removed from Karen Ann Quinlan if she was deemed by her physician and a hospital panel to have no reasonable chance for recovery. This decision fell to her father because Quinlan was not able to express her wishes at that time. It was a direct threat to

her life and was made without her knowledge or consent because she was in a persistent vegetative state (Halper, 1996).

If there is a high degree of certainty that a certain treatment will benefit a patient, the physician should discuss with the surrogate the rationale for offering this treatment and the risks associated with it. If, however, there is uncertainty regarding which treatment would be best aligned with the patient's goals, the physician and surrogate should decide together. Informed consent is the legal process of offering a treatment to a patient and discussing its risks and benefits, whereas shared decision-making is the process by which the physician exchanges information with the patient to allow them to decide between multiple options of treatment, including proceeding without treatment. If the patient cannot participate in the decision-making process, that authority is passed on to the surrogate decision-maker (Whitney, McGuire, & McCullough, 2004).

In our example case, if the patient can be stabilized, with his large stroke, the medical team should first elicit goals of care and then give their prognosis and treatment recommendations in the context of the patient's elicited goals. First, the team should decide whether the patient has the capacity to make health-care decisions. If not, his health-care proxy and/or living will document should be identified. Once a health-care agent is identified, the medical team should meet with the agent and the patient's family to determine the optimal treatment plan. If a living will is available, the care team and surrogate should use this document to help them make decisions, but ultimately, the decisions will be made by the surrogate.

Non-maleficence

Francis is an 82-year-old male who was found unconscious at the bottom of a stairwell by his wife. Emergency medical services were contacted, and they transported the patient to a nearby trauma center. Upon arrival at the trauma bay, he was still unconscious and was intubated. A computed tomography scan of his head showed large bilateral subdural hemorrhages with no shift. He was taken to the trauma ICU, where his intracranial pressure was closely monitored. By hospital day 2, the surgery team was starting to plan a family meeting to suggest limiting aggressive interventions because of his poor prognosis (his Glasgow Coma Scale [GCS] was 3T). Initially, the medical team did not expect the patient to ever regain consciousness or to perform any purposeful movement, let alone return to his prior functional state at home. On hospital day 4, however, the patient started to localize painful stimuli, which improved his GCS. Consequently, the surgery team decided to cancel the planned family meeting and instead to call the patient's wife to obtain consent for a tracheostomy and feeding tube, with plans to discharge him to a long-term care facility soon.

Ethical Questions

Is this an appropriate change in plan by the medical team?

How do we apply the ethical tenet of non-maleficence to aggressive treatments that may be offered to elderly trauma patients?

How should a patient's prognosis influence treatment recommendations?

"Primum non nocere." First, do no harm. Its origins coincide with the beginnings of medicine. On a daily basis, physicians weigh risks and benefits. In trauma patients, physicians need to decide quickly how they will avoid harm because many of these patients need immediate stabilization. Tools to assess outcomes after traumatic injuries in frail patients have been developed, as mentioned above in the section "Frailty" (Joseph et al., 2014; Maxwell et al., 2016).

In our example case, we describe an older patient who has sustained a significant traumatic brain injury (TBI). To decide which treatments are suitable for this patient, we need to first look not only at his chances of survival after a TBI but also at his risk of disability and dependence and his personal priorities and goals for treatment.

The Eastern Association for the Surgery of Trauma (EAST) geriatric trauma guidelines recommend an initially aggressive approach for elderly patients, unless an experienced trauma surgeon determines that the patient's injuries are not survivable (Calland et al., 2012). They also recommend limiting aggressive care in patients older than 65 years with TBI and an admission GCS ≤ 8 if there is no neurological improvement within 72 hours. However, a study from our group suggests that these parameters are not a reliable marker for long-term outcomes. Lilley et al. (2016) used data from a single level I trauma center to examine outcomes among older patients admitted with a GCS ≤ 8 . Patients were divided into "responders" and "non-responders," depending on whether their GCS improved within 72 hours. Responders had little improvement in the rate of independence at discharge. Although the mortality rate in the first 30 days was higher in "non-responders" than in "responders," when those who died in hospital were excluded, the mortality rate at 1 year was roughly the same in both groups. Monitoring progression of TBI patients for 72 hours is an example of a time-limited trial; such a trial is a communication and decision-making strategy that identifies objective markers for deterioration and defines potential actions that can be performed in a stepwise fashion if clinical deterioration occurs. It allows the family time to see how the patient is responding and to better understand the overall prognosis. Quill and Holloway (2011) defined the steps involved in a time-limited trial as follows:

1. Define the clinical problem and prognosis.
2. Clarify the patient's goals and priorities.
3. Identify objective markers of improvement or deterioration.
4. Suggest a time frame for re-evaluation.
5. Define potential actions to take at the end of the time-limited trial.

What does this information mean for Francis in the above scenario? Because he has been in the hospital for 4 days and his GCS had not improved by the 72-hour mark, he has already failed his time-limited trial. He had a slight response in his neurological exam, but only after the time-limited trial of 72 hours. Aggressive treatment beyond this is highly unlikely to help him return to a state of independence. The patient's health-care providers need to discuss his goals of care with his surrogate decision-maker to decide whether to offer further aggressive treatments, such as a feeding tube or tracheostomy. The tenet of non-maleficence must be adhered to while attempting to give care that is in accordance with the patient's goals.

Beneficence

Miriam is an 83-year-old female who fell in her kitchen while cooking dinner for her boyfriend. She had known pre-existing cervical stenosis and a known fear of surgery. At the tertiary trauma center, she was evaluated and noted to have a C5 fracture and to now be quadriplegic. In the trauma bay, she was intubated for dyspnea. She was immediately evaluated by the spine surgery service and admitted to the surgical ICU with a cervical collar in place. She was started on standard preventions, such as chemical deep venous thrombosis prophylaxis and a ventilator bundle. The trauma surgery team contacted her children but were unable to identify a health-care proxy agent. There was no documentation of advance directives. The patient was extubated on hospital day 3. She was evaluated by a physiatrist, with plans for discharge to a nursing facility. She underwent a swallowing evaluation by the speech and swallow service for dysphagia, which determined that she was aspirating and therefore could not be fed by mouth. A small-bore feeding tube was inserted for nutritional support, and she was started on chest physiotherapy and aggressive pulmonary toilet. Despite these measures, she developed pneumonia on hospital day 6 and required intermittent positive pressure respiratory support. On hospital day 8, a family meeting was conducted via telephone. This meeting focused on interventions that would be offered for Miriam, specifically a tracheostomy and percutaneous endoscopic gastrostomy (PEG). The only goals discussed at this family meeting were survival and hospital discharge. The family's understanding of Miriam's prognosis was not assessed nor were her goals of care or alternatives to surgery explored. By hospital day 10, Miriam was refusing both the tracheostomy and PEG and wanted her code status changed to "do not resuscitate." The following day, she was transferred back to the ICU with dyspnea and hypoxia. She expired in the ICU with her boyfriend at her side; her children were not present. When the hospital's "trauma performance improvement and patient safety meeting" reviewed this case, they determined that Miriam's death was not unexpected and that she was not likely to improve with treatment; however, several team members present felt

that Miriam was not cared for optimally in accordance with her goals. Specifically, they thought Miriam was overtreated and that her goals were more aligned with comfort measures rather than transferring her to the ICU for more aggressive care.

Ethical Questions

Was autonomy for the patient preserved?

Were proper goals of care addressed according to the tenet of beneficence?

What quality measures should be used in a case such as Miriam's?

Non-maleficence and beneficence must both be considered in the care of the trauma patient and weighed against each other. Beneficence requires that any treatment or procedure be done with the intent to do good for the patient and to promote their overall well-being and also to respect their values and preferences. The benefits of any procedure must be weighed against the risks. This calls to mind the principle of the double effect: a treatment may be offered to benefit a patient but may unintentionally also cause harm to the patient. This is where clinicians need to think long and hard to decide not only whether this is normally the right treatment to offer but also whether it is the right treatment for this older patient in this specific instance. In older adults, providing care with the intent of "doing good" for the patient must take into account the patient's comorbidities, frailty, level of functional independence, and quality of life before the trauma occurred, as well as the patient's understanding of each of these and their individual goals after hospitalization. In Miriam's case, state-of-the-art trauma care was provided, but was it the right treatment for her?

Current quality measures focus on 30-day in-hospital mortality and complications. However, even though Miriam died, she received goal-concordant treatment—she would not have wanted to survive in her paralyzed, debilitated state. In the care of the older trauma patient, outcomes such as comfort, dignity, long-term survival, functional independence, time with loved ones, and time spent at home rather than in a hospital or nursing facility may be more relevant than the 30-day in-hospital mortality and complication measure. As care of the older trauma patient improves, so must the metrics used to measure the quality of care delivery.

Justice

Harold is an 84-year-old male patient who was brought to the nearest level III trauma center by emergency medical services after slipping on the ice at home. At the hospital, his vital signs were normal, and his GCS was 14 because he was slightly confused. On imaging, he was found to have a femoral neck fracture and a small subdural hemorrhage. Because of the TBI, the emergency room physician decided to transfer him to a level I trauma center, about 45 minutes away.

Ethical Questions

Is it just for Harold to be transferred to a level I trauma center for a higher level of care?

The principle of justice concerns the equal distribution of scarce resources and protection of vulnerable populations. Rationing of resources should not be based on age alone but must take into account the individual patient's preferences and goals and the potential benefit of the procedure being offered. Utilitarianism is defined by the Oxford Living Dictionaries (2018) as the doctrine that actions are right if they are useful or for the benefit of the majority. Although utilitarianism dictates that we must consider the effects on a whole society when treating the individual patient, one must be careful not to undertriage (i.e., assign an inadequately low triage level) or undertreat older trauma patients. Physicians must consider the effect on society but also protect each older trauma patient in their care. However, geriatric trauma patients are consistently undertriaged in the field. A retrospective study from Maryland that evaluated 25,565 trauma activations found a 32% higher rate of undertriage in patients older than 65 (Chang, Bass, & Cornwell, 2008). This may be due in part to the fact that older patients are more likely than younger patients to sustain severe injuries from a low-energy mechanism; in addition, the severity of injury may be underappreciated by those triaging on the basis of mechanism alone (Sterling, O'Connor, & Bonadies, 2001). The Centers for Disease Control and Prevention (CDC) has recommended that advanced age (55) should prompt transfer to a trauma center. Recommendations such as this would support early aggressive resuscitation of the geriatric trauma patient and transfer to a trauma center. However, controversy remains as to whether higher-level trauma centers provide the best care to older injured patients. Goodmanson et al. (2012) retrospectively examined 104,015 patients in the Pennsylvania statewide trauma database and showed a significantly increased mortality risk starting at age 57 and an overall lower mortality risk for trauma care than for non-trauma care for all ages. Using the same database, another study in 39,000 patients found lower rates of geriatric mortality, complications, and failure to rescue at centers with a higher geriatric volume (Matsushima et al., 2014). Barmparas et al. (2016) examined geriatric patients with cervical spine fractures and showed no improved survival after transfer to a higher-level trauma center. Olufajo, Metcalfe, et al. (2016) hypothesized that the geriatric trauma proportion (GTP) cared for was a stronger determinant of outcomes than geriatric trauma volume (GTV). Using the California State Inpatient Database, the research group demonstrated that, compared with centers with the lowest GVP, trauma centers with the highest GVP had lower mortality, failure to rescue, and complications, whereas there was no association between higher GTV and lower mortality (Olufajo, Metcalfe, et al., 2016). These findings suggest that even some smaller, lower-level trauma centers have developed processes of care to address the unique needs of geriatric trauma patients and improve their outcomes.

One way for hospitals to improve trauma care of geriatric patients is to create a dedicated geriatric service for trauma patients. A study at a German trauma center compared data in patients >75 years old treated before ($n = 169$) and after ($n = 216$) introduction of a co-management model in which patients were co-managed by a trauma surgeon and a geriatrician: mean ICU length of stay decreased from 53 to 48 hours and mortality decreased from 9.5% to 6.5% (Grund, Roos, Duchene, & Schuler, 2015). Our hospital added a dedicated trauma geriatrician in 2013. In-hospital mortality was lower in the preintervention ($n = 215$) than in the postintervention ($n = 191$) group (9.30% vs 5.24%, $p = 0.12$), as was 30-day mortality (11.63% vs 6.81%, $p = 0.10$); however, the differences did not reach statistical significance because of the small sample size (Olufajo, Tulebaev, et al., 2016). Treatment by a trauma geriatrician is in alignment with the tenet of justice for this population, which is unique and deserves specialized care.

In our clinical scenario, the correct course of action is for the transferring physician to evaluate the extent of Harold's injuries and involve him in the decision regarding his potential transfer to a higher level of care. At this point in time, it is not clear which trauma centers have the best outcomes for older patients on the basis of the severity of their injuries. More studies are needed to help guide clinicians and patients on the type of hospitals that will provide the best care if they are in a situation similar to the one described in this vignette.

Clinical Pearls

- Geriatric trauma patients are not just older adult trauma patients. Older adults have unique physiological and psychosocial needs, which require that trauma care be tailored to their needs. It is estimated that over 50% of trauma patients are frail. Frail injured patients have particularly bad outcomes and high mortality in the year after injury (Joseph et al., 2014).
- The ethical tenets of autonomy, beneficence, non-maleficence, and justice should be used when making treatment decisions regarding geriatric trauma patients.
- Communication between the physician, patient, and family is crucial. Among older adults in an ICU, 71% have a surrogate involved in decision-making and 43% rely solely on a surrogate (Torke et al., 2014). Surrogates are frequently poorly prepared for this role and do not understand the patient's treatment goals (Lilley et al., 2017). Treatment decisions are especially difficult when changes in health status are dramatic and unexpected. Surrogates require guidance from the surgical team.
- Age should never be the sole determinant of care provided. Patients should be evaluated on an individual basis; their personal goals and values should be at the forefront of decision-making.

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Chapter 10

Primum Non Nocere: When Is It Our Moral Duty to Do More for Our Trauma Patients in Need?



Kimberly Joseph and Carol Reese

Understanding the Problem: Violence and Its Impact in the United States

The CDC reports that nearly 200,000 people die from injury each year (Centers for Disease Control and Prevention, 2017). Over ten million women and men are victims of violence by an intimate partner (Breiding et al., 2014). In 2015, 36,252 persons died from firearm injury, and from 2014 to 2015, the age-adjusted death rate increased by 7.8% (Murphy, Xu, Kochanek, Curtin, & Arias, 2017). In 2015, for persons aged 44 and under, unintentional injury remained the leading cause of death. However, suicide was the second most common cause of death for persons aged 15–34 and the third most common cause for persons aged 10–14. The number of firearm suicides was nearly double that of suicides from suffocation and more than triple that of suicides from poisoning. Homicide was the third most common cause of death for persons aged 1–4 and 15–34, and it was the fourth most common cause for persons aged 5–14.

From a societal standpoint, there is generally more agreement on how to deal with unintentional injury than intentional/violent injury. Seat belts are mandated in cars, as are fire-prevention devices in buildings; there are playground and window-guard standards in many jurisdictions. There is little controversy regarding the dangers of drunk driving. However, there is less agreement and standardization with

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regard to violent injury; while the reporting of child abuse and neglect is mandatory in most jurisdictions, the reporting of intimate partner violence is not. Firearm regulations and customs vary widely and are a source of divisiveness. As a result, health-care providers find themselves in difficult situations. A 2011 Florida law known as the Privacy of Firearm Owners Act, which attempted to restrict what physicians could say to patients about guns, was only struck down as unconstitutional by the 11th US Circuit Court of Appeals in 2017. The “Dickey Amendment,” a provision first inserted as a rider into the 1996 federal government omnibus spending bill (104th Congress, 1996), mandated that “none of the funds made available for injury prevention and control at the Centers for Disease Control and Prevention (CDC) may be used to advocate or promote gun control.” One consequence of this was that funding for gun violence research overall was reduced because it was assumed by some that it de facto “promoted” gun control. Elements such as these can leave practitioners in a state of limbo: unsure of what to say for fear of inviting rebuke, unsure of how to develop an evidence-informed opinion, and unsure of how to interact with colleagues whose opinions differ from theirs.

The Intersection of Violence and Trauma Care

Care for the physical injuries sustained by victims of violence is largely standardized, although robust trauma systems still do not exist in all areas of the country. The status of access to mental health services for victims of violence is even less reliable, despite the knowledge that many victims of these injuries will experience some type of psychological stress after the injury and that many have experienced prior stress that may or may not be related to the current injury. In a pilot study on patients seen in an urban level 1 trauma center, Reese et al. (2012) found that roughly 40% of patients screened positive for symptoms when administered by the Primary Care Posttraumatic Stress Disorder (PC-PTSD) screen. Equally as concerning was that nearly 40% of the patients’ self-identified family members also screened positive. Exposure to community violence has been suggested to have as devastating an impact on victims as direct experience of physical violence (Fowler, Tompsett, Braciszewski, Jacques-Tiura, & Baltes, 2009). Building on the initial definition of adverse childhood experiences (ACEs), as defined by Felitti et al. (1998), Cronholm et al. (2015) used an “expanded ACEs” list, which included experiencing racism, witnessing violence, living in an unsafe neighborhood, experiencing bullying, and having a history of living in foster care. In a predominantly African-American, urban, community-based sample, they found higher rates for six of the nine conventional ACEs compared with the initial Felitti study population. Furthermore, their data also suggested that limiting evaluation to the conventional ACEs might be inadequate: The levels of adversity experienced by men, African Americans, Hispanics, Asian/Pacific Islanders, and

those at or below 150% of the poverty line would have been underestimated if only conventional ACEs had been used. The World Health Organization now includes exposure to violence of various kinds in its assessment of ACEs (World Health Organization, 2018). The National Prevention Council report from 2011 documents that a history of exposure to adverse experiences in childhood, including exposure to violence and maltreatment, is associated with health risk behaviors such as smoking, alcohol and drug use, and risky sexual behavior, as well as obesity, diabetes, sexually transmitted diseases, attempted suicide, and other health problems (National Prevention Council, 2011). On a broader level, there is increasing acceptance that social/socioeconomic factors determine health outcomes in a profound way (Braveman & Gottlieb, 2014); this applies to those sustaining violent injuries as well as to those with other health issues.

National and local research and programming has been developed to address the issues surrounding the needs of victims of violence. The CDC has funded National Centers of Excellence to explore and implement evidence-informed and innovative violence prevention initiatives (Massetti, Holland, & Gorman-Smith, 2016). Programs have been implemented and replicated that use “credible messengers” to intervene and mediate in real time during violent incidents in communities to attempt to de-escalate conflict and reduce retaliation (Webster, Whitehill, Vernick, & Curriero, 2013). Over the last two decades, programs described as “Violence Intervention Programs,” which are often hospital based or hospital linked, have been promulgated and have shown promise. These programs often focus on victims of firearm violence, but they rarely limit themselves in that way. The overarching premise of such programs is that victims of violence require more than the addressing of their physical injuries in order to be successful in their lives. They require attention to their personal sense of safety, self-esteem, and hope for the future; they may need assistance in identifying and drawing upon innate coping skills; they need assistance in handling emotional issues stemming from current and/or past trauma; and they need practical assistance with such things as resuming/continuing education and employment, financial and legal issues, and family relationships. The programs that have been developed, which usually require both initial counseling and outreach by a trained practitioner, as well as some period of Intensive Case Management, have consistently shown reductions in recidivism. Many have also been able to document decreases in retaliatory behavior, depression/anxiety, and PTSD symptoms. These programs require a significant commitment of personnel, both in terms of numbers and time. They require an initial, significant financial investment on the part of an institution, although the cost savings in terms of decreased future hospitalizations and quality of life years gained have also been shown (Juillard et al., 2015).

Given the extent of the problem, one may postulate that practitioners who care for victims of violence are morally obligated to be active in legislative advocacy and/or to build comprehensive programs at their institutions to address

violent injury. Does placing that burden on a practitioner end up increasing moral distress in that practitioner? Perhaps revisiting the origins of our work can help answer these questions.

Returning to the Basics: Morality and Ethics

Merriam-Webster lists several definitions of “ethics,” including but not limited to the following: a set of moral principles; a theory or system of moral values; and the principles of conduct governing an individual or a group. The same source defines “moral” as of or relating to principles of right and wrong in behavior or sanctioned by or operative on one’s conscience or ethical judgment. Other sources characterize ethics as the rules of conduct that govern behavior in a particular group, imposed externally by the system on the individual; morals, on the other hand, are often thought to be internal, personal beliefs regarding right and wrong (Diffen LLC, 2016). A “moral person” might feel obligated to some broader obligation in his/her behavior in certain situations than strict ethics would dictate. Conversely, in theory, a person could behave ethically and have no morals per se. Ironically, the origins of the words would suggest that our current definitions perhaps should be reversed: “Ethics” originates from the Greek “ethos,” meaning “character,” implying an internal motivation; “moral,” on the other hand, comes from the Latin “mos,” meaning “custom,” which is suggestive of behavior.

In practical application, healthcare providers are furnished with a set of widely accepted “principles of bioethics,” which govern our behavior: autonomy, beneficence, non-maleficence, and justice (Beauchamp & Childress, 2013). The American Medical Association takes this a step further in its Code of Medical Ethics: It lists as a professional responsibility that “A physician shall respect the law and also recognize a responsibility to seek changes in those requirements which are contrary to the best interests of the patient” (Riddick Jr., 2003, p. 9). It also states that physicians should “Advocate for social, economic, educational, and political changes that ameliorate suffering and contribute to human well-being” (Riddick Jr., 2003, p. 10). Arguably, in most instances these responsibilities present no conflict among healthcare providers. However, how does one apply these principles when regulations or workplace rules limit our actions and potentially threaten our employment if we proceed? How, as has been seen in the realm of trauma care, does one work to reduce violent injuries from firearms when there is so much disagreement on the subject? When the ethics in such situations are not clearly defined, and there are opposing ideas of what is “moral,” how does an individual practitioner proceed? How does one deal with the “moral distress” of feeling that one knows the “right” thing to do but feels constrained in applying that knowledge?

Returning to the Basics: The Concepts of “Cure,” “Care,” and “Healing”

In modern times, we tend to think of cure as the relief from or removal of a disease. However, the origins of the word “cure” go back to the Latin “cura,” which actually means “care.” The goal of cure, then, was care; the notion of resolution of disease was not originally central to its execution. “Curates” were entrusted with care, in religious vernacular, souls. The modern word “care” itself is both a noun and verb: It can refer to the grief, concern, problem, or lament experienced by our patients and to the way in which we address those things. We must demonstrate our concern and empathy toward the suffering of our patients. We know, however, that after traumatic experiences our patients do not feel merely physical pain but also emotional, mental, and spiritual pain. The natural extension of the postulate is that “care,” done well, must address all those elements. In fact, one definition of care in the Oxford Dictionary is “the provision of what is necessary for the health, welfare, maintenance, and protection” of someone or something. Addressing the social determinants of health—including equitable and consistent access to healthy food, economic stability, housing, education, and social supports, in addition to access to the “healthcare system”—would then seem to be at least in part the responsibility of the healthcare provider. Indeed, Furler and Palmer opine that physicians and the organizations to which they belong have a moral imperative to respond to social health inequities in their everyday practice (Furler & Palmer, 2010). Providers of trauma care often deal with victims who are systemically disadvantaged; these disadvantages potentially contributed to the occurrence of the physical injury. If we examine the nature of the word “injury,” we recognize that it not only refers to physical harm but can also refer to moral, social, emotional, and/or spiritual harm. When a population or group is persistently subjected to social and health inequities and injustice, those in that group are repeatedly injured. Arguably, then, if we are responsible for the care of the injured, it follows that we should do what we can to address societal and existential, not just physical injury.

But does it then follow that provision of comprehensive care will always result in cure or “healing” or the cessation of injury? The word “to heal” has complex origins from Germanic roots (“khailaz,” meaning “undamaged”), but it can include notions of restoration and of removal of disease. For the patient with a gunshot wound to a major artery, healing or restoration of health often involves more than simply repairing the artery. Given the many elements involved in recovery from trauma (again, physical, emotional, psychological, and spiritual) and the complexity of addressing all the determinants of basic health, can the efforts of one practitioner (or even an institution) ever guarantee the desired outcome of complete healing? A practitioner may provide robust support for trauma recovery, but the degree and nature of a patient’s involvement are also important to achieve this outcome. Even if practitioners advocate for social justice on the larger scale, they may not be able to achieve

it for each individual patient. It is easy to envision a scenario in which practitioners become overwhelmed by what is perceived as the mandate to be and do all for everyone; the external dictates of what is “ethical” and “moral” lead to increased distress, burnout, and ineffectiveness. We ourselves become one of the “injured.”

The Personal “Moral Imperative”

Perhaps the answer to knowing when we have to “do more” for our patients is to acknowledge that any model that defines how we should do more must take into account both our own needs and abilities and those of our patients. We suggest that returning to and refining the meaning of what we do—exploring fully the aspects of “cure,” “care,” “injury,” and “healing”—must be contextualized for our patients *and* ourselves and that the “moral imperative” outlined by Furler and Palmer (2010) does not preclude personalization. The practitioner’s first responsibility, in this model, is always to provide the affective aspects of care, as comprehensively and holistically as possible, without prejudice, and regardless of patient compliance or outcome. As Forrow (2013) points out in his commentary on treating obese patients, we may be limited in our ability to ensure outcome, but the doctor-patient relationship (or provider-patient relationship) is the core of what we offer to those we serve and care for. Forrow writes specifically about obese patients, but the idea is particularly applicable when considering the relationship between a healthcare provider and a victim of trauma. The relationship starts with ensuring that the patient knows that we *do* care. It progresses naturally to addressing the nonphysical aspects of trauma recovery in an individual patient because a fully realized relationship will require discussion of these aspects. It benefits from incorporating notions of cure (as originally intended) and healing as a process of restoration, not just removal of disease. Doing this with individual patients is its own form of advocacy and should not be underestimated. It provides a model for one’s colleagues and creates an expectation of ideal care among patients, for which they themselves may eventually advocate.

The next steps in defining and executing one’s personal moral imperative may involve advocacy via a process of ever-widening circles of influence. Knowledge gained from relationships with individual patients may be used to inform practice within a division, department, or institution: Examples of this could include developing education for trainees and protocols around trauma recovery; developing and establishing patterns for screening and referral to mental health services; or working with institutional finance officers to provide for outpatient nutrition, transportation, or other services, if these are noted to be patterns of deficit. The multiple disciplines available in most trauma centers could be engaged to develop some form of trauma recovery or violence intervention program. Although this may be led by a specific practitioner, the responsibility (and gratification, when successful) should be shared by the entire team. The improvement of a single institution’s comprehensive care of its violently injured patients can be the work of a career and, in this model, easily satisfies the standard of meeting a personal moral imperative.

For the practitioner who has the energy, time, and wherewithal to go even further, opportunities exist to advocate on a community and societal scale. Again, by starting from the relationships with individual patients, understanding their trauma recovery needs (in the context of “true” cure and healing), and identifying common elements among patients, the practitioner can inform policy on a local, state, and possibly national level.

Conclusion

It is evident that those of us who care for the physically injured have an obligation to do more than just address those physical injuries. The degree to which we exercise this moral obligation depends on a number of factors, including our individual abilities. If we accept the premise that the obligation exists, however, and are open to the opportunities available to us, it is possible for each of us to define a personal “moral imperative.” The exercise of this moral imperative, whatever the scale, has the potential to positively impact the health and well-being of our patients and allow them to be successful and thrive.

Clinical Pearls

- Recognize that “doing more” for our injured patients can be as simple as improving one aspect of their care at our institution; often doing only that can lead to improvements in other areas as the institution begins to change and enhance focus.
- Clinicians should be aware of (and nonjudgmental about) their own abilities when choosing how to improve the overall care of injured patients. For example, it is more important that a clinician understands and embraces the necessity of providing emotional, psychological, and social support for a patient/family than to specifically be able to provide it her- or himself.
- As a corollary to the previous point, clinicians should seek out honest feedback regarding their interactions with patients and families. Such feedback can help the clinician identify strengths in their practice and opportunities for improvement and thus help improve patient outcomes.

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Chapter 11

Girls and Trauma: Performing Socio-Surgery through a Gender-Responsive Lens



Sherida V. Morrison and T-awannnda Piper

Introduction

Almost half of all American children have had at least one potentially traumatic adverse childhood experience (ACE; Sacks, Murphey, & Moore, 2014). ACEs are stressful and potentially traumatic events and experiences, e.g., abuse, neglect, parent with mental illness, incarcerated parent, etc. The effects of trauma are deeply entrenched in the fabric of our society, and girls have not gone unscathed. Research on ACEs has found that, across the board, girls suffer from higher levels of traumatic experiences than boys (Quinlan, 2016). The fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5; American Psychiatric Association, 2013) defines trauma as exposure to actual or threatened death, serious injury, or sexual violence in one or more of four ways: (a) directly experiencing the event; (b) witnessing, in person, the event occurring to others; (c) learning that such an event happened to a close family member or friend; and (d) experiencing repeated or extreme exposure to aversive details of such events, such as with first responders. Historical factors such as poverty, racism, discrimination, bullying, and community violence are adverse events that also play a role in childhood trauma (Wade, Shea, Rubin, & Wood, 2014). When faced with social disadvantages, girls of color are more vulnerable to trauma and have lower rates of well-being. Girls with high ACE scores, reflecting multiple childhood traumas, tend to have low educational attainment and school performance, chronic absences, decreased reading ability, and high rates of suspension and expulsion. These outcomes are often associated with girls' involvement in systems where they are criminalized and re-traumatized. Trauma is

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inheritable in the sense that its traits and characteristics can be passed down to the next generation. As a result, untreated, traumatized girls can develop into women who struggle to cope with the physiological and psychological effects of trauma, which could impact their ability to function as adults and to parent effectively.

Literature Review

There is a lack of research that examines girls and trauma from a gender-responsive lens. While there are bodies of research on girls' experience of trauma and on gender responsiveness, specifically for justice-involved girls, there is a significant lack of research on the two combined. The review included in this chapter is a compilation of research that examines the physiological, psychological, and social effects of trauma in girls and is by no means comprehensive of the entire body of research on girls and trauma.

Biological and Neurological Effects

A recent study from Stanford Medical Center examined differences in the effects of trauma on brain development in boys and girls. The study reported no differences in brain structure between boys and girls in the control group; however, differences were noted among traumatized boys and girls in a portion of the insula called the anterior circular sulcus (Digitale, 2016). In boys, the volume and surface area of this brain region were larger in the traumatized group than in the control group, and in girls, they were smaller in the trauma group than in the control group. These findings suggest that trauma symptoms may differ in boys and girls. The study also found that adolescent girls with previous exposure to trauma appeared "to undergo accelerated maturation in a region of the brain [the insula] that integrates emotions and actions" (Digitale, 2016). Depression and anxiety are leading mental health concerns in adolescents, especially girls, and by mid-adolescence girls are twice as likely to be diagnosed with a mood disorder than boys (Johnson, 2014).

De Bellis and Zisk (2014) examine the biological effects of trauma in their review of the research on the neurobiological sequelae of childhood trauma in children and adults with histories of childhood trauma. Childhood traumas, particularly those that are interpersonal, intentional, and chronic, are directly correlated with increased rates of depression, anxiety, antisocial behaviors, and substance abuse. Seltzer, Ziegler, Connolly, Prosofski, and Pollak (2013) exposed children to an experimental stressor (the Trier Social Stress Test for Children) and reported higher levels of oxytocin and lower levels of cortisol in girls with histories of physical abuse but no difference in hormone response in abused boys. Research also suggests a relationship between childhood trauma and increased inflammatory and immune activity (De Bellis & Zisk, 2014).

Adolescent Development and ACEs

There is a body of research which has identified a correlation between high levels of stress and early puberty in girls. The longitudinal study conducted by Ellis and Essex (2007) tests the work of the life history theorists Belsky, Steinberg, and Draper (Belsky, Steinberg, & Draper, 1991). The findings on familial and ecological stressors in early childhood and their effects on variation in timing of adrenarche and development of secondary sexual characteristics in early adolescence supported the life history perspective. Quality of parental investment emerged as a central feature of the proximal family environment in relation to pubertal timing. Lesesne and Kennedy (2005) expanded the early childhood and life history argument in a report published by the Centers for Disease Control and Prevention (CDC). Their data revealed that social and environmental risk factors, such as abuse and dysfunction in childhood, are related to health risk behaviors and poor mental health in adulthood. The report highlighted the lifelong implications of ACEs and the potential for cyclical and intergenerational impacts on mental health.

ACEs can have negative, lasting effects on health and well-being in childhood or later in life (Felitti et al., 1998). However, more important than exposure to any specific event of this type is the accumulation of multiple adversities during childhood, which is associated with especially deleterious effects on development. Finkelhor, Shattuck, Turner, and Hamby (2013) replicated the ACE Study findings in a cohort of youth, using psychological distress as an outcome measure, to explore whether the adverse effects enumerated by the ACE Study could be improved upon by considering a more comprehensive range of possible adverse effects, including some of the domains not considered in the ACE Study. They found considerable improvement in the value of the original ACE scale when childhood adversities not included in the original scale were added and others in the original scale were excluded. The results indicate the plausibility of increasing the predictive ability of ACEs by adding additional domains in childhood adversity that have harmful effects on child development (Finkelhor et al., 2013). Researchers argue that measuring childhood adversities during childhood, rather than later in adulthood, could further improve the ACE Study's early life predictors of health outcomes, and future studies should focus on preventing and mitigating harmful exposures and investigating whether there is an improvement on health outcomes (Finkelhor et al., 2013).

Girls are the fastest-growing segment of the juvenile justice population, and status offenses still remain the primary reason that girls enter the juvenile justice system. Girls who experience multiple childhood traumas are at heightened risk of contact with the juvenile justice system and other negative outcomes. Almost half of the girls in the juvenile justice system have experienced five or more ACEs and report an above-average number of mental or emotional problems and traumatic experiences in comparison with boys. The rates of sexual abuse among girls versus their male counterparts are staggering. One in four American girls will experience some form of sexual violence by the age of 18. In the juvenile justice system, girls report past sexual abuse at twice the rate of boys, and nearly two thirds of girls in

the system (65%) show signs of posttraumatic stress disorder (PTSD) (Epstein & González, 2017). Justice-involved girls, on average, experience sexual violence at an earlier age and for a longer average duration than other forms of abuse. Lesbian, gay, bisexual, transgender, and questioning (LGBTQ) youth and young adults are increasingly vulnerable to maltreatment and traumatic experiences (McCormick, Scheyd, & Terrazas, 2017). Girls who are lesbian, gay, bisexual, transgender, or nonconforming report trauma at particularly high rates, and women who identify as lesbian report higher rates of sexual violence than their heterosexual peers (Bernhard, 2000). Although LGBTQ youth comprise only 5% to 7% of the general population, they represent 13% to 15% of youth who come into contact with the juvenile justice system. According to the 2015 report, “The Sexual Abuse to Prison Pipeline: A Girl’s Story,” sexual abuse is one of the primary predictors of girls’ entry into the juvenile justice system (Saar, Epstein, Rosenthal, & Vafa, 2015).

Urbanism and Race

Girls growing up in urban, under-resourced environments are often predisposed to risk. As defined by *Urban Girls Revisited: Building Strengths* (Ross Leadbeater & Way, 2007), *urban girls* is a term used to refer to girls who are exposed to the risks associated with living in urban communities plagued by high rates of community violence, poverty, drugs, homelessness, and inadequate housing and low rates of resources related to health, education, and social capital. The urban environment can increase girls’ exposure to trauma. Girls living in adverse, inner-city circumstances often grow up fast, taking on multiple adult roles and responsibilities at young ages in contexts of minimal support (Ross Leadbeater & Way, 2001). Wade Jr. et al. (2014) expanded the ACE study to examine the breadth of adversity to which low-income urban children are exposed. Additional experiences not included in the initial ACEs but endorsed by study participants included single-parent homes; exposure to violence, adult themes, and criminal behavior; personal victimization; bullying; economic hardship; and discrimination. Lower social cohesion among neighbors and higher crime rates also contribute to higher rates of psychotic symptoms among urban children (Newbury et al., 2016).

At the national level, while 60% of white non-Hispanic children have experienced no ACEs, this is the case for only 49% of Hispanic children and 39% of Black non-Hispanic children (Sacks et al., 2014). In the United States as a whole and in every subregion, Asian non-Hispanic children have the lowest prevalence of ACEs—nationally, more than three-quarters of these children have had no ACE (Sacks et al., 2014). As a social identity, race is an important factor in how girls are perceived, diagnosed, and treated for trauma-related behaviors. It has been widely reported that Black girls are suspended, receive more punitive forms of school discipline, and are incarcerated at higher rates than girls of any other race or ethnicity (Crenshaw, Ocen, & Nanda, 2015). *Girlhood Interrupted: The Erasure of Black Girls’ Childhood* (Epstein, Blake, & González, 2017) examines the adultification of Black girls as a

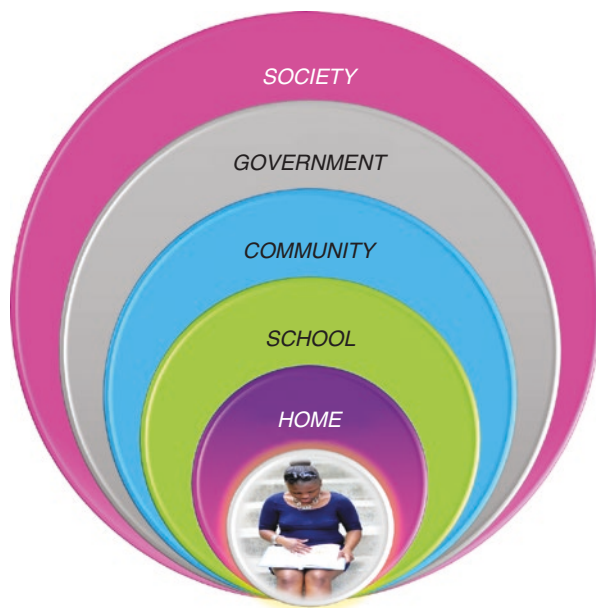
“social or cultural stereotype that is based on how adults perceive children ‘in the absence of knowledge of children’s behavior and verbalizations.’” According to the surveyed respondents (predominantly white and female), Black girls were viewed as more adult than white girls. Black girls were also perceived as needing less nurturing than white girls and being more knowledgeable about sex than their white peers. Researchers posit that adultification may serve as a contributing cause of the disproportionality in school disciplinary practices, harsher treatment by law enforcement, and differentiated exercise of discretion by officials across the spectrum of the juvenile justice system. This increases the vulnerability of Black girls to be pushed into the school-to-prison pipeline and to be overrepresented in the juvenile justice system.

Epstein and González (2017) have compiled one of the few reports that examines girls and trauma from a gender-responsive lens. The study examines trauma-informed yoga as a treatment for trauma among girls detained in the juvenile justice system. The physical and psychological consequences of trauma can be long-lasting, especially without early intervention. Identifying trauma and helping girls to heal from these experiences is imperative for lifelong psychological health (Levine & Kline, 2006). The socio-environment of girls should provide access to “socio-surgeons” in metaphorically “sterile” (gender-responsive) environments that provide the nurturing and safety needed for girls to begin the process of healing prior to adulthood.

Socio-Ecology and Socio-Surgery

In a perfect world, the components of Earth’s various ecosystems work in tandem with one another to create a tightly woven web that ensures that the available resources are sufficient for all the species in the ecosystem. The socio-ecological model and theory developed by Urie Bronfenbrenner (Bronfenbrenner, 1979) describes healthy communities as having similar components to Earth’s ecosystems. The various components, i.e., individuals, interpersonal relationships, community, organization, and policies, make for a balanced socio-ecological system (Fig. 11.1). Bronfenbrenner suggested that an individual’s behavior is influenced and shaped by social networks, institutions, laws, policy, and how individuals choose to access relationships with these. The theory encompasses the idea that healthy and equitable communities include the driving forces of affordable housing, high-quality education, a thriving and inclusive economy, and a solid network of neighborhoods and businesses. These driving forces are similar to the energy flow within an ecosystem wherein there are enough producers and consumers to balance the system. High-quality education and schools act as the foundation for most socio-ecological systems. Within communities that are in socio-ecological balance, girls become thought leaders, innovators, and entrepreneurs. Girls who have access to high-quality education tend to pursue academic careers, which increase their ability to become self-sufficient with diversity in skills and professions. A diversified community that

Fig. 11.1 A girl-centered socio-ecological model



includes equitable housing, employment opportunities, and a consistent economy, along with access to high-quality education, creates a cycle of health, wellness, and success for girls within a balanced socio-ecological system. Although all relationships within a community are important for the healthy development of girls, the role of men, especially fathers, play a key role in reducing the incidences of trauma within a socio-ecological system. Studies demonstrate that the strong presence of caring men can serve as a protective factor in reducing risk among girls.

The high rates of trauma among African Americans are the result of trauma-impacted socio-ecological systems and their relationship with slavery, discrimination, institutional racism, economic segregation, violence, abuse, and inequities in housing, health, and education. Historically, African American ecosystems were resilient despite their marginalization. Strong educational and religious institutions, kinship, neighborhoods, and economic viability opened the door for diversified economic growth, thriving Black-owned businesses, and career advancement in every field. However, opioid and crack invasions, deteriorating communities, unemployment, crumbling educational systems, and the devastating mass incarceration and deaths of African American men created threats that compromised the socio-ecological balance that protects children.

Similar to natural ecological systems, groups of individuals mutate or change to fit the environment. The increasingly high rates of absent fathers create single-headed households, often led by women. Having to provide for the family, women were forced to increase their work hours, thus reducing their time spent at home and making their daughters the next in line for responsibilities. Taking on the task of caring for younger siblings, preparing meals, and seeking employment to help carry

the financial load at home is a reality not only for some African American girls but also for some Latinas. Girls of color residing in trauma-impacted, under-resource communities experience higher risks of low educational attainment, expulsion, juvenile justice involvement, teen pregnancy, and violence. We argue that some girls have mutated emotionally, physically, and mentally, for the purposes of survival, because of the socio-ecological breakdown within trauma-impacted communities. The adaptation has reduced empathy, compassion, and healthy bonding with others within the community. A study released by the CDC states that high incidences of ACEs, such as sexual abuse, drug addiction, incarceration, and abandonment, exacerbate the high probability for serious violent behavior among girls.

The reinvestment of community-based assets and support from external organizations can strengthen challenged socio-ecological systems. *Demoiselle 2 Femme*, NFP (D2F), a Chicago-based not-for-profit organization that offers a myriad of programs and services for adolescent girls, has integrated Bronfenbrenner's theory into programs as the foundation for combating the socio-ecological breakdown in communities that surround girls. The organization has developed a model from Bronfenbrenner's framework that includes the girl (individual), home, family, school, community, and society (see Fig. 11.1). The primary goal of the approach and its use of behavioral change theories is to shift from a problem-centered model aimed at attacking negative youth behaviors to asset-based approaches which strengthen the family, school, and community as protective factors in supporting the social and emotional needs of girls.

For girls of color, there have always been some vulnerabilities within the socio-environment, but resilience was much more of a reality because of the presence of family, caring adults, and strong community systems of support. Girls are experiencing multiple traumas that can affect their ability to "bounce back." Researchers argue that resilience is not an outcome of childhood trauma (De Bellis & Zisk, 2014). Symbiotic relationships between families, high-performing schools, physical and mental clinicians, faith-based and community-based organizations, legislators, and government agencies are significant in the reversal of negative behavior that is expressed by girls exposed to trauma. Practitioners from all spheres of Bronfenbrenner's socio-ecological model must be mobilized to change the trajectory of girls of color who are impacted by trauma. Changing the course of girls who have faced ACEs requires specialized practitioners. We have coined the term "socio-surgeons" to refer to these practitioners. Socio-surgery is performed through the creation and implementation of gender-responsive policies and practices that support the needs, development, and experiences of girls. Socio-surgeons can function as educators, mentors, family members, social workers, community- and faith-based organizational leaders and staff, policy makers, civic leaders, doctors, and any role that functions in the socio-environment of a girl. Through gender-responsive practices, socio-surgeons perform the delicate surgery of cutting away the cancerous effects of trauma by supporting the social and emotional wellness and healing of girls. Socio-surgeons are well versed in reducing the socio-ecological "traumaprint" by strengthening family connections, identifying community assets, building support networks, and leveraging resources, coupled with advocacy and

policy that embrace gender responsiveness. Similar to a handprint, a “traumaprint” is a psychosocial imprint representing the enormity and impact of adverse childhood experiences on an individual that can affect their engagement with each socio-ecological sphere of influence (Fig. 11.2). We argue that “traumaprints” can be passed down generationally which increase its enormity. Socio-surgeons work to champion a gender-responsive socio-ecological system.

The Gender-Responsive Lens

The American Sociological Association describes gender as a social construct that transcends the biological identity of sex and points to the ubiquity of gender’s influence in both private and public spheres. It also identifies differences—and similarities—in how genders are treated socially and factors that change this treatment. There are important gender differences in the rates and impact of trauma, as well as responses to it. Researchers have long argued the need for gender-responsive approaches to address trauma. Theoretical frameworks for gender responsiveness are often grounded in the Feminist Pathways Theory (Daly, 1992), Relational Cultural Theory (Miller, 1976, 1987), and the Intersectionality Theory (Crenshaw, 1989). Each theory postulates the complexities of the experiences of women while presenting a distinct lens on the factors of race and ethnicity, gender, culture, class, and relationships. Yet, overwhelmingly, gender-responsive studies and practices have focused on incarcerated women and girls.

To expand the discourse, we have developed a comprehensive definition of gender responsiveness (Bloom, Owen, & Covington, 2003) for girls that can be adapted to reflect any group. We believe that gender responsiveness is the deliberate creation

Fig. 11.2 A pictorial view of the “traumaprint” reflecting multiple adverse childhood experiences (ACEs)



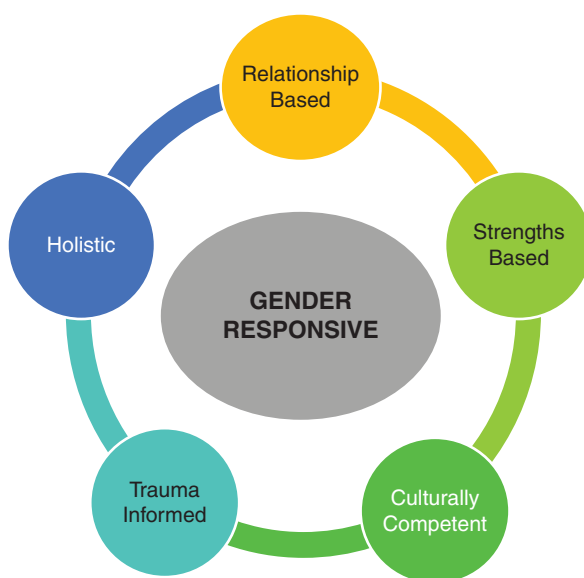
of programs, practices, policies, and systems in the socio-ecological environment that demonstrate value for female adolescent development by providing services, treatment, and care that are relationship-based, asset-based, trauma-informed, holistic, and culturally competent.

The inclusion of the socio-ecological framework (Bronfenbrenner, 1979) in our definition of gender responsiveness provides a spatial foundation for the necessary inclusion and intentionality of gender responsiveness in every sphere of influence in the socio-environment. In this context, all systems and institutions of socialization have a responsibility to practice gender responsiveness—beginning with the family. Researchers argue that the largest contributor to childhood trauma in the United States is family dysfunction because almost half of child-onset mental disorders are preceded by child abuse, neglect, and family dysfunction (Green et al., 2010). The adoption and integration of gender-responsive practices can create “air bags” for all girls, regardless of ACE scores, that protect them from the effects of trauma and other developmental hazards. In this context, risk factors are reduced by enhancing the protective spheres of influence that buffer girls against negative developmental trajectories. Unfortunately, the systems designed to provide education, protection (child welfare), and justice more often perpetuate the criminalization and re-traumatization of girls.

As practitioners of socio-surgery, we recognize the implementation of gender responsiveness through five core practice areas (adapted from Benedict, 2008) (Fig. 11.3):

- *Relationship-based*: working with girls using transformational rather than transactional approaches to establish and strengthen the bonds of trust and respect

Fig. 11.3 Gender-responsive model: five core practice areas



- *Asset-based*: intentional movement away from deficit, problem-based approaches to recognize that all girls have strengths which can be mobilized and maximized
- *Trauma-informed*: acknowledgment of the impact and effects of trauma and how the history and context of trauma plays an important role in how girls may respond to services
- *Holistic*: acknowledges the girl, her background, and development (physical, social, educational, emotional, spiritual, psychological, etc.) as a whole rather than several unrelated and separate components
- *Culturally competent*: Provides services that value and acknowledge the diverse needs of girls from different cultural backgrounds

While socio-ecology and gender responsiveness each have their own merits, the amalgamation of the two yields a comprehensive framework that can create collaborative practices across sectors. In spherical practice, as represented in the socio-ecological model, schools as institutions of formal education and socialization can institute gender-responsive programs, policies, procedures, and practices that support educational equity and social-emotional learning. In the sphere of community, institutions such as clinics and hospitals can provide care through a gender-responsive lens that is trauma-informed as well as inclusive of the remaining four practice areas (relationship-based, asset-based, holistic, and culturally competent). Law enforcement and juvenile justice systems can approach and engage all girls, regardless of their circumstances, through gender-responsive policies and practices in arrests, court representation, sentencing, detainment, incarceration, restorative treatments, and aftercare. Given the prevalence of abuse among girls, we argue the increase in physical altercations between girls and school resource officers/law enforcement, specifically males, underlines the need for immediate policy reform that provides for the safety of girls rather than exacerbating existing trauma. Without a commitment to gender responsiveness, the socio-ecological spheres designed to protect girls will inexorably be conduits of trauma that cause detrimental and, in some cases, irreversible harm to girls' emotional and physical well-being.

Efforts to increase the numbers of skilled practitioners in gender responsiveness across the ecological spheres can be achieved through the development of Communities of Practice (CoPs). As a social learning system (Wenger, 2010), a CoP can be designed within an organization to intentionally create a shared domain of interest, connectedness, and peer-to-peer learning through codified and tacit knowledge sharing. Outside of an organization, CoPs can be designed to provide shared learning experiences for practitioners in a specific field or to convene stakeholders as learning partners regarding a specific issue, in this case gender responsiveness. As competences increase, a regime of competence will emerge in the CoP. The regime of competence in a community of practice translates into a regime of accountability—accountability as to what the community is about and its open issues and challenges. The intentionality around CoPs specifically for learning in gender responsiveness can increase the number of skilled practitioners equipped to champion and implement gender-responsive policies and approaches.

Conclusion

The effects of trauma permeate society. The issues related to ACEs do not belong to the girl alone, but every stratum of the socio-ecological system has a responsibility to curtail trauma. As girls transition into adulthood, the cyclical effects of trauma can be costly for both society and individuals. Societies need to do more to foster hope and resilience in girls. A commitment to reduce trauma must come from all spheres within the socio-ecological model. Because “gender-specific” does not automatically imply “gender-responsive,” programs, schools, and service providers must be trained in responsive practices to ensure that girls are able to begin a positive journey back to wellness. Gender-responsive interventions have reported positive outcomes for incarcerated women and girls. A gender-responsive (trauma-informed, culturally competent) somatic intervention that used yoga in system-involved girls reported improved self-regulation and other emotional developments, improved neurological and physical health, and healthier relationships and parenting practices (Epstein & González, 2017). Unquestionably, more research is needed to examine the impact of gender-responsive approaches and practices on girls who have experienced trauma outside of the juvenile justice system. An investment in the social-emotional health and safety of girls today is imperative for future generations and for the sustainability of positive cycles of wellness within socio-ecological environments.

Clinical Pearls

- Adverse childhood experiences (ACEs) and trauma affect girls differently than boys; therefore, gender-specific and gender-responsive prevention, interventions, services, and policies need to be created and developed to repair socio-environments that include girls.
- The effects of trauma on Black girls far outweigh similar experiences of their contemporaries, and socio-ecological systems that surround girls of color should integrate all five core practice areas of gender responsiveness when providing services or care.
- The lack of gender-responsive practice in the socio-ecological environment increases the risk of re-traumatization, criminalization, and victimization among girls.
- Gender-responsive “socio-surgeons” are needed in every spherical composition of the socio-ecological model to address and reduce incidences of trauma among girls.
- Communities of Practice (CoPs) can be developed in organizations and professional communities across sectors to increase the proportion of skilled practitioners equipped to champion gender-responsive policies and practices.

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Chapter 12

An Internist's View of Trauma Units: From Ancient Warfare to Modern Assistive Technology



Cory Franklin

War

The surgery of wounds arising in military service concerns the extraction of missiles. In city practice experience of these is but little, for very rarely even in a whole lifetime are there civil or military combats.

—Hippocrates

This quote by Hippocrates from the fifth century BC (often paraphrased and simplified as the more familiar, “War is the only proper school of the surgeon”) is evidence that since antiquity war has been a primary impetus for medical progress and, specifically, trauma care. The same human ingenuity that creates weapons of combat and the capacity to kill simultaneously discovers the means to heal and save lives. The ancient Romans developed sophisticated field stations behind battle lines to treat wounded foot soldiers. To control hemorrhage, Roman surgeons refined the art of the tourniquet and practiced amputation to prevent the spread of gangrene. In the Middle Ages, European surgeons routinely perfected their craft at so-called schools for surgery—the battlefield—where gunpowder caused injuries unknown outside combat. French surgeons, notably Ambroise Paré, employed innovative modes of therapy for war wounds (Hamby, 1967). Paré used ligatures to tie off blood vessels after amputation and abjured the use of boiling oil to cauterize wounds. However, success was limited as a consequence of the notoriously poor hygiene on the battlefield.

During the Crimean War in the 1850s, the practice of nursing was revolutionized and dignified by the legendary Florence Nightingale. A decade later, American nurses gained similar status and esteem during the Civil War, the first war where triage of patients from the field was implemented on a large scale. In the Franco-Prussian and Boer wars of the late nineteenth century, doctors discovered the value of antiseptic technique in penetrating gunshot wounds.

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From a medical standpoint, the carnage of the World War I produced advances in orthopedics, neurosurgery, and psychiatry, as well as measures to prevent the spread of infectious disease on the battlefield, including advanced wound antisepsis, tetanus antitoxin, and typhoid vaccination. Ironically, despite the lives saved by these interventions, the close quarters of trench warfare and military training, and the ensuing demobilization at the end of the war, gave rise to the influenza pandemic that claimed more than 50 million victims worldwide—the most deadly epidemic in the history of mankind.

After blood typing was discovered in 1901 by Austrian physician Karl Landsteiner, direct blood transfusion from patient to patient became feasible; however, it was limited throughout World War I because blood could not be stored for prolonged periods. The work of Bernard Fantus at Cook County Hospital led to the ability to preserve blood for 10 days, an astounding advance. In 1937, Fantus established a “Blood Preservation Laboratory,” later renamed the “Cook County Blood Bank,” the world’s first blood bank for prolonged blood storage (Janega 2014). Stored blood was used for transfusion during the Spanish Civil War and on a much greater scale in World War II.

Penicillin, discovered in 1928, was first used extensively in World War II. The effect was close to miraculous, both on wound infections and for bacterial pneumonia. Infected battle wounds had been the scourge of every previous war, and now penicillin saved countless soldiers. In addition, the mortality rate from pneumonia, 18% in World War I, dropped to under 1% in World War II. From January to May 1942, 400 million units of pure penicillin were manufactured. By the end of the war, American pharmaceutical companies were producing 650 billion units a month.

Combat surgeons became essential battlefield personnel in World War II and that “greatest generation” of military physicians trained several future generations of surgeons. The training of these physicians played a large role in the subsequent development of trauma units in the United States. Many of these combat surgeons also served in the Korean War, where helicopters were first employed extensively to transport soldiers and the Mobile Army Surgical Hospital (MASH) unit was developed. Perhaps you remember Elliott Gould, Donald Sutherland, and Sally Kellerman or, if you are a little younger, Alan Alda, Wayne Rogers, and Loretta Swit. The MASH units were designed to bring experienced surgeons closer to the front lines to operate on wounded soldiers more quickly. Along with improvements in the treatment of shock and hemorrhage, these units were demonstrably effective in reducing the mortality of wounded soldiers.

These innovations, along with extensive research on resuscitation in hemorrhagic shock during the Vietnam War, led to a dramatic fall in battlefield mortality. In World War II, 30% of all Americans seriously injured in combat died. In Vietnam, despite more lethal weapons, 15–25% of all serious wounds proved fatal. Twenty-first-century wars in Iraq and Afghanistan accelerated the pace of medical miracles and changed the approach to battlefield medicine. Formerly, the guiding philosophy of military surgery was definitive wound repair as quickly as possible. Now, more lives can be saved by emphasizing rapid control of bleeding in the field, onsite resuscitation, and, after stabilization, transport of patients for definitive surgery to

larger support hospitals in-country or, in the case of more complex injuries, back to the United States.

On the battlefield, small mobile medical teams are now equipped with sophisticated equipment and drugs undreamt of in previous wars, including chemically treated bandages that stop bleeding, genetically engineered drugs to promote clotting, and portable diagnostic ultrasound equipment. In the Iraq and Afghanistan wars, once a severely injured patient was stabilized, the average transport time to a US facility was 4 days compared with 45 days from Vietnam back to the United States in the 1960s. These advances, along with the refinement of Kevlar body armor and helmets, kept the harrowing figures of nearly 7000 American deaths in Iraq and Afghanistan from being much higher. The mortality rate for wounded soldiers was somewhere between 8% and 12%. Given equivalent injuries, today's soldier is 50% less likely to die than his Vietnam counterpart 50 years ago.

No matter what the political outcome of war, all Americans benefit from the sacrifice of our valiant men and women. The Vietnam-era adage "War is unhealthy for children and other living things" remains truer today than ever, but it is reassuring to realize that the knowledge gained and the techniques perfected in battlefield care are ultimately applied to civilian medicine and especially to today's trauma units (Gabriel & Metz, 1992).

The Cook County Trauma Unit

The Cook County Trauma Unit was founded in March 1966, less than a decade before I came to work at Cook County Hospital. It was the first comprehensive civilian trauma unit in the United States and was established by two surgeons with experience in military medicine, Drs. Robert Freeark and Robert Baker. The unit was designed to give priority to trauma patients and make their injuries the focus of clinical care. As described in the 2015 book *A History of Surgery at Cook County Hospital*, "The plan called for a readily available general surgical team with essential consultant and support personnel and adequate logistical assets, concentrated in a designated area within the larger general hospital. The always-available trauma team and dependable resources were prime reasons for initial and continuing success" (Guinan, Printen, Stone, & Yao, 2015, p. 145).

Before the Cook County Trauma Unit was created, patients who came to the hospital with blunt and penetrating trauma were evaluated in the emergency room and triaged to whichever surgical service was thought best to care for their problem. That haphazard approach had several obvious limitations: patients occasionally triaged to the wrong service because a serious injury was overlooked; patients with multiple injuries often misprioritized; and patients located all over the hospital in mass casualty situations. Most importantly, the most experienced nurses, doctors, and ancillary personnel were not always the ones caring for the patients who needed their services. This was especially true because much of the trauma occurred at night or on weekends when more experienced staff were less likely to be available.

The solution to these problems was a centralized trauma unit with a dedicated staff and special body of knowledge.

Drs. Freeark and Baker, the “Two Bobs,” were in the same residency class at County, and they turned out to be the right men at the right time. Both were superb surgeons and brilliant outside the operating room. Temperamentally, they could not have been more different. Dr. Freeark served in the Marine Corps in World War II, and he was a gracious, unassuming man, always looking to be a consensus builder. Dr. Baker, who served in the Army in the Far East, was a flashy dresser, notorious for his hazing of students and residents. They referred to him—never to his face—as “Hollywood Bob” for his fancy clothes and late-model car. (I often heard him called this nickname when he and I were both attending physicians at the University of Illinois, after he left County.)

The key moment in the creation of the trauma unit was a visit the two doctors made to Austria. As Dr. Baker told it, “At an International Society of Surgery meeting in Europe, Dr. Freeark and I met Professor Jorg Bohler, an Austrian trauma surgeon of international recognition whose basic interest and training was in general and orthopedic surgery. His major clinical interest was in the trauma management system in Austria. All road accident victims were taken to one of six trauma hospitals, arranged at strategic intervals along major freeways. These hospitals had been planned and built immediately following the end of World War II. Surgeons were facile in managing all facets of vehicular accidents, including head injuries, torso trauma, fractures and dislocations, and extensive soft tissue injury. Most importantly, all accident patients, regardless of patient or family wishes, were taken to the closest of these highly efficient, well-staffed, and equipped hospitals where the surgeons were devoted to trauma care in all of its aspects. Dr. Freeark and I subsequently met Professor Bohler’s son, also a renowned Austrian trauma surgeon, who invited Freeark to come to Austria and see how their system functioned. He did, and after due deliberation we decided to open the Chicago version of the trauma hospital, the Cook County Hospital Trauma Unit” (Guinan et al., 2015, p. 151).

Besides the “Two Bobs,” two other key personnel in the development of the trauma unit were Dr. William Shoemaker and his wife, Norma. (I met them through their pioneering work at the Society of Critical Care Medicine.) Dr. Shoemaker, a Chicago-born, Harvard-trained surgeon, was a tall, no-nonsense man with a head for numbers. He had cared for Dr. Martin Luther King when Dr. King was hit in the head by a brick thrown during a civil rights march in Chicago in 1966.

Dr. Shoemaker’s major contribution to the trauma unit was his creation of the Shock Research Unit. Using groundbreaking techniques and physiologic measurements, he explored the hemodynamics of shock and resuscitation. His sophisticated mathematical models were essentially the forerunner of today’s “big data,” and they remain the basis for our understanding of surgical shock. Dr. Shoemaker ultimately migrated to Southern California, where he helped found the Society of Critical Care Medicine and became the first editor of the society’s journal, *Critical Care Medicine* (Lumb, 2016). Aware that I was from Chicago, Dr. Shoemaker would fondly recall his experiences in the Cook County Trauma Unit to me years later at dinners with other pioneering figures in critical care, including Drs. Max Weil, Ake Grenvik, and Peter Safar.

Norma Shoemaker was an experienced nurse with a meticulous eye for detail and a flair for organization. She was the first nursing director of the trauma unit, and her role was just as important as and in some ways more important than that of the founding surgeons. A graduate of the esteemed Hahnemann Hospital in Philadelphia, Norma's role was described thusly in *A History of Surgery At Cook County Hospital*, "Norma recruited a group of spectacularly talented nurses, held extensive training and educational seminars for them, and was the power that drove the nursing engine. She had superior relations with everyone, was remarkably knowledgeable and was always willing to share her experience with attending physicians (who sometimes needed it), residents (who almost always needed it), and medical students" (Guinan et al., 2015, p. 152).

Ms. Shoemaker's long-standing legacy to the trauma unit was in her vision of a cooperative, rather than hierarchical, medical-nursing relationship, in the finest tradition of Florence Nightingale. She recalled, "In my discussions with Drs. Baker and Freeark, I shared my convictions concerning the factors that would be essential for a trauma unit to function optimally. I felt that the administration would have to provide the funds for equipment and personnel and then leave the unit to function autonomously insofar as it was possible. I envisioned an atmosphere of camaraderie where the doctors weren't captains of the ship but rather rowers in the same boat with the nurses, technicians, and other medical staff. The medical and nursing directors absolutely had to share a common vision. Drs. Baker and Freeark wanted a top-notch trauma service that would provide teaching opportunities for their surgical residents and a clinical research program that could produce work that would be published in the finest peer-reviewed journals. After we had discussed our concepts and goals, we agreed that we could do it. We would set up a trauma service that handled all of the trauma patients presenting at CCH [Cook County Hospital]. The patients would bypass the ER and go directly to the trauma unit. Any bumps in the road would be solved by our wonderful communication system. There were bumps, but the system worked because we did communicate, and the hospital administrator in charge of our program was most helpful" (Guinan et al., 2015, p. 155).

By the late 1960s, the trauma unit was admitting between 5000 and 7000 patients/year. About 70% of those admissions were the victims of violence, a reminder that the inner-city problems of violence in Chicago are not a new phenomenon. The remainder of admissions were split evenly between vehicular trauma and other causes.

Up until that time, Chicago employed a "nearest hospital" ordinance, i.e., police vans and first responders had to take accident and trauma victims to the nearest hospital. Quite often, these were small neighborhood hospitals, understaffed and ill-equipped to handle trauma. Sometimes, transfer to Cook County would take hours, and many patients undoubtedly died as a result of the delays. After losing a patient with liver trauma to exsanguination because of a transfer delay, an angry Dr. Baker wrote a letter to the editor of the City News Service excoriating the "nearest hospital" concept. The resultant publicity from his letter was the stimulus to the new approach to trauma triage, trauma care, and the establishment of designated trauma hospitals in Chicago.

Medical Consultation

As a result of the heated political turmoil surrounding Cook County Hospital in the hectic days of the 1960s, Dr. Freeark finally left for Loyola University Medical Center in Maywood in 1971. During this time, Dr. Baker also left to go across the street to the University of Illinois Medical Center. The leadership of the trauma unit fell to two aggressive young surgeons, Robert Lowe and Gerald Moss.

Dr. Lowe, barely out of his residency, was a cerebral and charismatic figure, popular with the house staff. Dr. Moss was a sharp-tongued, experienced veteran who had served in Vietnam, the first Vietnam veteran to assume a leadership role in the trauma unit. Together, they worked in a number of research areas, including artificial blood, the indications for laparotomy in abdominal trauma, and acute respiratory distress syndrome (ARDS, the condition first described in Vietnam as “trauma lung” or “Da Nang lung”) (Ashbaugh, Bigelow, Petty, & Levine, 1967). They also created a Saturday morning combined surgical conference between County and the University of Illinois that was open to everyone, surgeons and non-surgeons. This was my first exposure to the trauma unit.

As a medical extern, and later as a resident and attending physician, I spent my initial training time with the trauma unit staff at those legendary surgical conferences. I came to the conference to learn “trauma for internists.” In my memoir *Cook County ICU: 30 Years of Unforgettable Patients and Odd Cases* (Franklin, 2015), there is the story of one memorable case discussed at this conference. After the conference, I would frequently corner Drs. Lowe and Moss to ask them questions that were most certainly naive or uninformed, coming from an internist, but the two surgeons were uniformly gracious. (Unfortunately, one of my most vivid memories of that time is walking out of the conference with them one day and overhearing Dr. Lowe’s complain to Dr. Moss about back pain he was having. Dr. Moss advised him to get it checked out. Tragically, the back pain turned out to be an early symptom of advanced Ewing’s sarcoma. Not long after that, Dr. Lowe died, far too young—a promising career cut short.)

If there was a limitation to the trauma approach in those years, it was the surgeons’ reluctance to consult with internal medicine. Many of the senior surgeons came from training traditions where surgery handled all clinical problems by themselves, a philosophy that was particularly prevalent for decades in the city’s university hospitals.

Perhaps as a result of his background in Vietnam, where surgeons were forced to work in close contact with other physicians, Dr. Moss was more amenable than most to consulting with internists, and he encouraged me to work with the trauma team. When I became director of the Medical Intensive Care Unit (MICU), I made it a priority to develop a collegial approach with the trauma unit surgeons, which included sending our critical care fellows there for training in trauma.

Dr. Moss eventually left to become the Dean of the University of Illinois College of Medicine, and Dr. John Barrett, assisted by Dr. Roxanne Roberts and Dr. John Fildes, took directorship of the trauma unit (Slater, 2002). All three had been surgical

residents at the same time I was doing my medical residency, so we had known each other and worked together for years. There was a long-standing mutual respect, and, in fact, Dr. Roberts and I worked together as consultants to the 1993 film *The Fugitive*. We did not always agree on everything, but the working relationship between the trauma unit and MICU was one of the best in the country. In this respect, I have been, and continue to be, an advocate of two principles: first, internists should learn the essentials of trauma diagnosis and treatment; and second, trauma surgeons should avail themselves of the knowledge their medical consultants bring in a number of areas.

Common Medical Problems in Trauma Patients and Where to Treat

A number of trauma patients present with, or develop, serious medical problems while they are in the trauma unit. It has always been important for the trauma team to recognize these problems and call the medical consultants early in the patient's hospital course. The critical decision for the team and the consultants is whether to manage the patient in the trauma unit or in the MICU (or cardiac care unit, in the case of heart problems). The deciding factor is whether the surgeons are confident that the trauma problem has been controlled and the definitive surgery has been performed. In our experience, when the trauma problem was still active, the patient was obviously best handled in the trauma unit, and when the trauma problem was controlled, the medical problem was generally handled better through transfer to one of the medical units. The most frequent medical problems in the trauma unit were pulmonary complications, which were especially common after rib fractures, head trauma, and upper abdominal surgery. Many of these patients required high concentrations of oxygen or mechanical ventilation or both. In some cases, the medical team was involved with management of oxygen therapy, weaning from mechanical ventilation, and extubation in complicated patients. In patients with prolonged abnormal mental status or who needed long-term pulmonary toilet, whether to perform a tracheostomy was always an issue. One of the most successful cooperative projects between the trauma unit and the MICU at Cook County was the bedside percutaneous tracheostomy. Because so many MICU patients required tracheostomies for prolonged ventilation or suctioning and our early tracheotomies were done as open surgeries, we were dependent on several things we could not control: ENT surgeons, operating room time, and anesthesia availability. Because the hospital was so busy, all three of those were hard to come by. Our tracheostomy problem in the MICU demanded a solution.

One of our critical care fellows, Dr. James Adams, provided that solution. He came from the University of Tennessee, where Dr. Pat Hazard was one of the world's foremost experts in bedside percutaneous tracheostomy. During his residency, Dr. Adams learned to perform the procedure from Dr. Hazard, and Dr. Adams, in

turn, taught our attending physicians at County. Soon, some MICU attending physicians learned to perform a bedside tracheostomy in less than 6 minutes. They eventually gained more experience in performing the technique than anyone in the country, even Dr. Hazard. (Like Dr. Lowe, Dr. Hazard tragically died too young.)

While we learned the percutaneous tracheostomy procedure, we needed surgical backup, which the trauma team agreed to perform. When they saw how quickly and easily it could be done, they also wanted to learn the procedure, and our attending physicians taught it to them. Eventually, most elective tracheostomies done in the MICU and trauma unit were done at bedside. In our experience at County, in non-emergency situations in experienced hands, the percutaneous tracheostomy remains comparable to the open surgical tracheostomy (Friedman et al., 1996).

Another common medical problem in the trauma unit was bacterial or fungal sepsis or both, often seen in patients with prolonged hospital stays, especially in those with head or abdominal trauma. Infectious disease consultation was essential, but if the cause of sepsis was not surgical—i.e., wound or intra-abdominal abscess where surgical drainage was necessary—often the patient was optimally cared for in the MICU. This decision called for close communication between the MICU and the trauma unit. While a trauma patient with medical sepsis could be managed in the trauma unit adequately, triage of a patient who had undiagnosed surgical sepsis to MICU often resulted in delayed surgery or a fatal outcome. For that reason, the MICU internists had to be intimately familiar with the signs and symptoms of surgical sepsis to prevent mistriage.

MICU was sometimes consulted by trauma on patients who abused drugs or alcohol. The most difficult dilemma was handling alcohol withdrawal in the trauma patient. Usually, the patient's trauma was alcohol related—a drunk driving accident or a fall or violence caused by inebriation. The patient's hospitalization created a situation where he or she no longer had access to alcohol (not infrequently, the patient was incarcerated before being hospitalized, and the incarceration was the precipitating factor in withdrawal).

When the patient had been drinking daily for more than 6 weeks, this enforced abstinence generally resulted in a major withdrawal syndrome that usually complicated care. Delirium tremens, the most severe form of alcohol withdrawal, was potentially fatal and extremely hard to control. One perpetual area of disagreement between the trauma team and the medical team was how to manage delirium tremens. The surgeons preferred continuous alcohol infusion, whereas the medical team preferred using cross-tolerant benzodiazepines.

While continuous alcohol infusion would suppress the symptoms and allow the surgeons to perform the necessary surgery, it was usually only a temporary solution. Symptoms would recur after the alcohol infusion was stopped. Consequently, the patient was often transferred to MICU for definitive management with weaning doses of sedative hypnotics. Another reason for medical consultation in the trauma patient, besides alcohol withdrawal, were the many complications of alcoholic cirrhosis (e.g., coagulopathy, gastrointestinal bleeding, hepatic coma) in patients with alcohol abuse of years' duration.

The relationship between the trauma unit and the MICU was a two-way street. It was important for the trauma team to teach the MICU team the basics of trauma diagnosis and evaluation—especially which imaging studies should be obtained to confirm a trauma diagnosis. Occasionally, a patient with a trauma-related problem was mistakenly triaged to MICU. (In one embarrassing situation, by failing to inquire about recent trauma, a senior medical physician sent a patient to MICU with right arm weakness and a diagnosis of a cerebrovascular accident. An X-ray of the arm subsequently revealed a fractured humerus.) The cause of hypotension and low hematocrit in MICU was usually, but not always, gastrointestinal bleeding—more than once a patient had an undiagnosed pelvic fracture or peritoneal bleeding after blunt trauma. Without an index of suspicion by the medical team, something they were taught by the trauma team, the patient might not survive. A pelvic X-ray or abdominal CT scan would usually reveal the source of the problem.

Assistive Technology and New Careers Created by Trauma Care

Trauma care has been the incentive for advances in medical care and innovation in general, and at the same time, it has created new roles and specialized opportunities for caregivers. Once again, war is the model—during the great conflicts of the nineteenth and twentieth centuries, new careers became a working reality for nurses and then orderlies, physiotherapists, and administrators. In British field hospitals in World War I, for the first time, there were large numbers of female nurses and male orderlies working close to the front. The shortage of available men also prompted the need, heretofore unheard of, for female ambulance drivers and factory workers.

The same opportunities have evolved in twenty-first-century trauma unit. Today, there are more patients surviving with trauma-related devastating brain damage and paralyzing spinal cord injuries than ever before. Trauma units now employ specially trained therapists to help people move (physical therapy), aid people with breathing problems (respiratory therapy), help those with difficulty communicating (speech therapy), and return people to daily activity (occupational therapy). But today, these patients require even more.

All this could present a genuine opportunity, especially for tech-savvy young people looking for a new startup career in assistive technology therapy. The use of computers, tablets, and smartphones in medicine is rapidly emerging. With the advent of these new customized devices, there is a need for specialized therapists whose primary focus is to evaluate the specific assistive technology needs of patients with trauma-related disabilities and help those patients use personalized technology. Patients with neurologic sequelae, vision problems, or other disabilities will benefit from the latest computer hardware and software, and they could actively participate in everyday activities by using these assistive technologies (Rispoli, Machalicek, & Lang, 2014).

The three keys to helping patients via assistive technology are to improve their environment, their communication skills, and their mobility. Besides being essential for communication and getting around, the new hardware and software may also be the patient's best means of interacting with others and combating loneliness, one of the underappreciated problems of recovery from trauma. (Interestingly, the late Robert W. Taylor, one of the pioneers of the Internet in the 1960s, envisioned it even then as primarily a long-distance communication tool). Often, these disabled patients require specially customized devices because standardized equipment may not be right for them, e.g., tablet screens may be too small, or patients may not have the dexterity or strength to use smartphone keys. However, this is not simply a matter of having the right devices. Just as importantly, these patients need well-trained therapists to help them because they may need to be familiarized with the new technology or they may be unaware of the full capabilities of what the technology can actually do for them.

In today's medical environment, the call should go out to hospitals, universities, and trauma units to devise curricula and interact with other therapists to teach prospective assistive technology therapists. The modern assistive technology therapist should learn about different medical conditions and the specific limitations those conditions present for patients, as well as about the solutions available through emerging technology. The therapist must be familiar with the latest computer hardware and software and should understand how to teach the patient with disabilities.

Assistive technology therapists could then become part of every trauma unit and trauma rehabilitation clinic. Imagine a cadre of trained professionals working with trauma patients, custom-fitting them for the right devices and helping them learn (or relearn) not just how to communicate and move about but how to search the Internet, use social media, and even play video games. When he was in his 30s, former NFL player Steve Gleason contracted amyotrophic lateral sclerosis (ALS), a condition in football players that many believe is related to chronic brain trauma. Because patients with advanced ALS cannot talk, they need help communicating, and Gleason, confined to a wheelchair, has been working with Microsoft to develop specific assistive technology—new computer tablets that use eye-tracking technology and speech-generating software.

Gleason has described his personal progress: "I can do anything an ordinary person can do on a tablet computer. ... Talk, videoconference, text, stream music, buy Christmas presents online, pay bills, tweet" (Martin, 2016). He and Microsoft are currently working on a wheelchair he can drive with his eyes. What they are doing was unimaginable a generation ago, and the goal is to make it possible for others to do the same. Many trauma patients face the same difficulties as Steve Gleason. As Microsoft demonstrates with Gleason, this is a chance for the Silicon Valley companies such as Apple and Google, and even small startups, to develop research capabilities and customized products for the health-care market.

Medicine's early adaptation to the computer age was to develop devices like the electronic medical record, the computerized scanner, and the robot that can perform surgery. Although these innovations have been undeniable advances in patient care,

they have all had the unintended effect of causing less interaction between caregivers and patients. The resident typing into the electronic record does not make eye contact with his patient; the consultant looking at the scan no longer performs a physical exam on her patient; the surgeon, once intimately involved, now operates with a robot at a distance from the patient. But, at the same time, medicine can take advantage of computer technology and still reverse this trend of depersonalization. In the future, this will mean more assistive technology therapists, a critical first step to creating a new personalized “high-tech, high-touch” approach.

Robotics will also be an essential part of the trauma unit of the future. Amputees can be fitted with state-of-the-art prosthetics made from high-tech plastics and metal alloys. Using microprocessors and hydraulics, these sophisticated prosthetics employ sensors that react to electronic impulses from intact muscles. Under the supervision of highly trained staff, the patient with a prosthetic can actually return to most physical activity. The emerging science of medical robotics, combined with new devices and software, can create miracles of recovery in trauma patients (and, in fact, has done so for many soldiers wounded in the Gulf War).

PTSD and Its Implications for the Trauma Unit

The effects and damage of trauma can be long-lasting not only physically but also emotionally. Trauma is at the heart of posttraumatic stress disorder (PTSD), a condition that has attracted popular and medical attention in recent decades. PTSD can lead to depression, aggressive behavior, drug abuse, or suicide and is not limited only to the victims of trauma; it can be seen in friends and family members of victims and caregivers as well. As such, recognition and treatment of PTSD is a critical aspect of the modern trauma unit.

Although PTSD was not formally identified until the 1980 revision of the American *Diagnostic and Statistical Manual of Mental Disorders* (DSM-III), published soon after the Vietnam War, the psychological damage associated with trauma has been known for at least two centuries. In nineteenth-century Victorian Britain, victims of railway accidents often reported flashbacks and debilitating anxiety. It was believed that trauma aggravated the nerves in the injured patient's spine. One of the most well-known treatments was by the renowned French neurologist Jean-Martin Charcot, who treated “railway spine” through hypnosis, usually without success.

The debate over the psychological effects of trauma and its treatment had profound social and economic implications all across Europe. Germany pioneered workers' compensation in the 1880s, and patients with nervous trauma from industrial accidents often filed claims. If German insurance boards rejected the claims of these trauma survivors, the survivors would often feel doubly traumatized, first by the accident and then by years spent appealing the decisions.

In World War I, what came to be known as PTSD was recognized as a dreaded complication of combat. British surgeons referred to it as “shell shock,” a malady

believed to be related to “railway spine.” Responsibility for treatment shifted from surgeons to neurologists and psychiatrists. Along with hypnosis, electric shock and psychological coercion were employed, often to no avail. Many men were too psychologically damaged to respond and were eventually consigned to asylums.

During World War II, military psychiatrists encouraged soldiers to recount their nightmares and fears. Recognizing the psychological component of battlefield breakdowns reduced the stigma of the condition. In August 1943, General George Patton slapped two soldiers suffering from battle fatigue, and he was subsequently reprimanded publicly and forced by General Eisenhower to apologize. That event, perhaps more than any other, brought home the grim reality of PTSD to the general public.

Today, it is understood that PTSD is not only a battlefield condition but also a problem seen in civilian trauma. It is especially common in mass shooting incidents—in victims and in the first responders (Franklin, 2013). Nurses, physicians, and other health-care workers are also susceptible to the stresses of caring for trauma victims. Psychotherapists trained in emotional understanding should be part of every trauma unit and available to everyone. Because the emotional difficulties of PTSD are often chronic, psychotherapists should also be accessible for long-term follow-up in trauma clinics. There are invaluable lessons to be learned in the treatment of PTSD, and attention to PTSD should be an essential part of every trauma unit.

A Community Resource

The modern trauma unit is a community resource. Besides the obvious medical knowledge and treatment provided there, the trauma unit offers care, compassion, understanding, and counseling (as well as the aforementioned employment opportunities), all of which are invaluable to victims and the community in general. It is all too easy to visit the trauma unit late on a Saturday night and witness the harrowing experience of a family being informed that their loved one has died and think of the unit only as a place of ineffable sadness and tragedy. With all the good that happens there, the trauma unit can and should be thought of as a place of eternal optimism.

Clinical Pearls

- Pulmonary complications are the most important reason for medical consultation in trauma patients. These complications may be the result of the initial traumatic incident or a secondary event resulting in atelectasis, pneumonia, or barotrauma. This may necessitate consultative management for problems with oxygenation or ventilation or both.
- In complicated trauma cases or those involving extensive neurologic compromise, long-term airway care may be necessary (usually where an artificial airway will be required for more than a week). Often, a percutaneous

tracheostomy, performed in the trauma unit, is an effective technique for providing prolonged airway care.

- Sepsis is a common problem complicating trauma. It is essential to distinguish between surgical sepsis, which generally requires drainage or reoperation or both, and medical sepsis, which must be treated with antibiotics, according to blood culture and sensitivity.
- Trauma is often a consequence of alcohol or drug ingestion. Some patients will experience withdrawal while they are being treated for their trauma problems. Prompt diagnosis, including ruling out other neurologic and metabolic causes of agitation, and treatment with cross-tolerant sedative hypnotics is essential to patient recovery.
- Therapists with experience in computer hardware, software, and teaching patients with disabilities will play an important role in the modern trauma unit. These therapists will be instrumental in helping patients relearn communication and mobility skills.

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Chapter 13

Empowerment: The Ethical Dilemma



Danby Kang and Mamta Swaroop

Imagine a red cone inside a black box with two holes cut in it, one at the top and one on the side. The hole one peeks into can change what one actually sees: one sees a triangle or a circle, neither of which is the reality of the object (Sobelson et al., 2013). If one does not take into account the different perspective of what is, in reality, the same object, one cannot accurately describe the object. One must accept the other perspective to truly grasp the identity of the object. Similarly, if two groups do not have a common understanding of a problem, especially when the solution to problem depends on both groups acknowledging the same basic ideals, an ethical dilemma arises because as there is no foundation to attempt finding a solution.

Trauma itself is not easy to define, and it is not straightforward to build and implement a trauma system if caregivers and care receivers do not have a common understanding of trauma and trauma systems. Trauma and injury are often used interchangeably; however, they are not the same. Injuries can be categorized as intentional and unintentional and describe an acute exposure to physical agents whose quantity exceeds the threshold of human tolerance. Agents can include mechanical energy, heat, electricity, chemicals, or radiation. Injury can also occur as a result of a sudden depletion of agents essential for life (Baker, O'Neill, Ginsburg, Baker, & Li, 1991). Trauma includes the above, but it is not as simple to define. At times, it may refer to physical injury inflicted on the body, in the simplest of medical definitions. Comprehensively, trauma includes physical and mental health; and, systematically, it includes prehospital, in-hospital, and posthospital care and outcomes.

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Trauma affects communities across the globe physically, psychologically, and economically. In 2013, 4.8 million deaths were attributable to intentional and unintentional injuries worldwide, accounting for approximately 10% of the global burden of disease (GBD) and 247.6 million disability-adjusted life years (DALYs) (Haagsma et al., 2016). A DALY is the sum of years of life lost (mortality) and years lost to disability (morbidity). One DALY represents the loss of 1 year that could have been spent as a healthy individual; the loss is due to either premature death or disability. Over 90% of all injury-related deaths happen in low- and middle-income countries (LMIC) (Krug, Sharma, & Lozano, 2000). Even more alarming is that half of these deaths fall into the group of people aged 15–44 years, a group representing the majority of the working population in most countries (Nilsen, Hudson, & Lindqvist, 2006). The economic implications of these statistics are significant. A systematic review on the cost of injury and trauma in LMIC showed that the median direct medical costs per hospitalization were US\$291, corresponding to 15% of the gross domestic product (GDP) per capita. When accounting for direct medical, direct nonmedical, and indirect costs per injury, the median cost was US\$4085, corresponding to 97% of the GDP per capita (Wesson, Boikhutso, Bachani, Hofman, & Hyder, 2013). Had mortality rates in LMIC been reduced to those in high-income countries (HIC), not only would more than two million lives have been spared but an estimated economic benefit of approximately US\$758 to 786 billion per year would have been achieved (Kotagal et al., 2014).

With five million deaths and another 30 million people disabled, the burden of trauma far surpasses that of communicable diseases. Furthermore, road traffic incidents (RTI) are projected to become the third most likely cause of life lost globally in 2020, whereas they were the ninth most likely cause in 1990 (Murray & Lopez, 1997). Since the first “Global Burden of Diseases, Injuries, and Risk Factors Study” in 2010, the GBD has been regularly updated by the World Health Organization (WHO), which recognizes injury as a significant cause of morbidity and mortality in LMIC. Subsequent studies point out the economic losses from injuries and advocate for better surveillance systems and sustainable interventions (Chandran, Hyder, & Peek-Asa, 2010; Dalal, Lin, Gifford, & Svanström, 2013; Higashi et al., 2015). As a society, we identify injury and trauma as a substantial public health problem, and yet trauma remains a leading cause of morbidity and mortality in LMIC.

The data clearly indicate trauma systems in LMIC need to be improved. The involvement of all stakeholders, from the government to the community, is a must for successful development and implementation. Through an integrative and collaborative approach, empowerment of a community can lead to sustainable change, with resources allocated from within the country. Having a trauma system with a strong foundation builds a society, ready for empowered communities.

Empowerment refers to a process by which an individual understands the course and results of an action and has the ability to exert influence and control over said action (Zimmerman, 2000). The process of implementing empowerment can be described in four steps: (1) strengthening experience and proficiency, (2)

strengthening community framework and capacity, (3) removing barriers, and (4) strengthening assets and resources (Fawcett et al., 1995). This process closely aligns with the four characteristics required to achieve equality in health promotion: strengthening individuals, strengthening communities, improving the environment, and promoting health policies (Whitehead, 2007).

Involving citizens in trauma management in a grassroots fashion corresponds with the first two steps of empowerment, and development of a trauma system corresponds with the third and fourth steps. An ideal development can only happen when the interests of the stakeholders and beneficiaries align. Here is where the dilemma lies: How does one engage each stakeholder and beneficiary and assure that the set goals will come to fruition when these aspirations are based upon ideals that are dependent on a common understanding? We propose a systematic way of approaching this dilemma, i.e., from the bottom-up by training first responders, from the top-down by establishing a trauma care system, and from the synergistic benefit of this bidirectional approach. These three components of the approach are discussed in more detail below.

Training First Responders

Individual members of a community can contribute to healthcare as trauma first responders by calling for help, controlling hemorrhage, and evacuating victims to safe areas. A drastic improvement in trauma-related mortalities is possible when prehospital care improves by training laypersons to administer proper first aid in trauma, and certain LMIC have seen a clear improvement in survival rates by administering this model (Mock, Jurkovich, nii-Amon-Kotei, Arreola-Risa, & Maier, 1998). Bystanders are also present at 60–97% of all trauma cases and are more likely to assist when they have some first aid training (Bakke, Steinvik, Eidissen, Gilbert, & Wisborg, 2015; Pelinka, Thierbach, Reuter, & Mauritz, 2004).

Improved outcome is only a fraction of the benefit of involving laypersons. Additional benefit is gained from the presence and participation of community members, which allows each individual to take on roles as both a provider and a beneficiary. In addition, the first responders can be a valuable resource and play an active role in injury surveillance. As a person in direct contact with those involved in the incident, first responders can collect and provide data to facilitate future prevention initiatives (Nakahara, Ichikawa, Kimura, & Yoshida, 2008).

Involving community members in trauma care transforms passivity into active ownership of healthcare and allows a situation that is normally chaotic to be controlled. Empowering individual members of a community and eventually the whole community is a fundamental step in mobilizing society toward health equity. Empowering those at high risk to participate in and care for or help save an

individual's life may actually prevent them from taking another life. However, this approach alone cannot tackle the issue of trauma care in places where the system has not even begun to catch up with the grassroots efforts: without hospitals in the vicinity of the community or a mode of transportation to a hospital, the efforts of bystanders are without hope of survival.

Establishing a Trauma Healthcare System

A trauma system works within a geographic unit to provide a full spectrum of organized care to injured patients. These efforts are joined with the local public health system. Trauma care systems are structured into prehospital, in-hospital, and post-hospital care. These subgroups are further categorized into emergency medical services, human and medical resources, infrastructure, and rehabilitation, depending on the stages of injury care. In the United States, studies have demonstrated that patients who are treated at a trauma center have an overall lower risk of death after an injury (Celso et al., 2006; MacKenzie et al., 2006; Shafi, Nathens, Elliott, & Gentilello, 2006). In addition, care at trauma centers was shown to be more cost-effective than care at non-trauma center hospitals (MacKenzie et al., 2010). These findings are very important in the setting of LMIC, where the incidence of death from trauma far exceeds that in HIC.

On the basis of the recognition of trauma as a major burden in LMIC and the success of using trauma systems in HIC, the WHO and the International Association for the Surgery of Trauma and Surgical Intensive Care (IATSIC) spearheaded the development of the Essential Trauma Care (EsTC) project, which was launched in 2004. Since then, EsTC has made progress in certain LMIC, including India, Vietnam, Ghana, Sri Lanka, Botswana, and Mexico (Mock, Joshipura, Goosen, & Maier, 2006). The outcomes of the project remain to be determined over time. However, the participating countries have already rapidly conducted a thorough needs assessment survey at a national level and have quickly engaged stakeholders to participate. The evaluations determined that basic resources and training were most critically needed at the level of district or primary hospitals, which receive the highest volumes of trauma (Arreola-Risa et al., 2006; Hanche-Olsen, Alemu, Viste, Wisborg, & Hansen, 2012; Quansah, 2006; Son, Thu, Tu, & Mock, 2007).

Given the financial constraints in LMIC, judicious and efficient distribution of resources in trauma care is crucial. To fulfill this need, implementation of trauma systems is often initiated by international organizations in partnership with respective ministries of health, as in EsTC. Such multi-sector efforts facilitate the mobilization of efforts and standardize the distribution of resources specific to the needs of each region. However, the top-down approach is not a sustainable model by itself. Without proper human resources, training, trust of the community, and buy-in to the system, the system is inoperable.

Bidirectional Approach

A review of trauma system development in LMIC shows, models of successful trauma programs are highly variable and depend on the needs of the specific region. Callese et al. (2015) identified four characteristics of successful trauma care models: an initial systems-based needs assessment, system-wide coordination, targeted corrective action, and development of context-appropriate models. All four components underscore the need for evaluating a trauma system at the level of the community and individuals. In short, trauma system development must occur at a point where top-down and bottom-up approaches have reached a common understanding, which allows them to be sustainable and beneficial to society.

A bidirectional approach to designing trauma systems maximally involves all stakeholders. From the top-down, it urges politicians, international organizations, and even private businesses to identify trauma as a priority and to facilitate the development of trauma systems nationally. It also takes the definition of trauma into account from the perspective of both the caregivers and the patients. From the bottom-up, it converts ordinary citizens, who were once only beneficiaries, to stakeholders who take the initiative to mobilize change locally. It also provides training not only for the community but also for caregivers, so that all stakeholders speak a common language when caring for those affected by trauma.

While it is important for all parties to reach a common understanding, the top-down and bottom-up approaches need not occur simultaneously. The course of a bidirectional development depends largely on the needs and existing resources of the environment. Take the following experiences as examples:

The authors' global surgery lab, the Northwestern Trauma and Surgical Initiative (NTSI), successfully implemented a trauma first responder training course in Chicago by first performing a thorough needs assessment survey with focus groups and then by eliciting constant feedback from the community. The course was founded in response to the high death toll from gun violence despite having six level I trauma centers within the Chicago city limits. Since its inception in January 2017, the instructors have trained more than 1500 community members in 2 years. The course focuses on prehospital and pre-ambulance care and uses basic but lifesaving skills in resource-limited settings. Participants of the course had both short- and long-term knowledge retention, as well as a significant increase in empowerment metrics. However, this effort is guided under the assumption that patients will eventually be transported to a level I trauma center, where they will receive appropriate medical and posthospital care.

Similarly, NTSI also attempted to implement a trauma first responder training course in Santa Cruz de la Sierra, Bolivia, with the goal of reducing prehospital mortality. However, it soon became evident that, although the individual community members were motivated to receive training in basic lifesaving skills, there was no existing semblance of a trauma system to receive these potential trauma patients. Tourniquet application may stabilize a bleeding patient at the scene, but it will not

save a patient's life in a situation where there is no emergency medical service or a hospital with appropriate facilities. After realizing the bottom-up approach alone was insufficient, the group redirected efforts toward writing legislation to implement programmatic development focusing on education, for example, to improve advanced trauma life support (ATLS) pass rates for practitioners, a central dispatch system, and emergency medical technician training.

These two examples are in different phases of bidirectional development, but both engage stakeholders of multiple sectors at varying levels. First responder training is targeted at community members but has garnered the interests of larger organizations for in-kind donations, the Department of Public Health for collaborative opportunities, and the public school systems for curricular support.

Although trauma is traditionally viewed as a surgical realm, it is a multidisciplinary practice. For example, the evolution of trauma systems in LMIC requires basic supplies, such as equipment for airway management, chest tubes, and blood products. These are resources that can expand to provide support for intensive care or general emergency services. In another example, in response to the EsTC, South Africa and Ghana established formal emergency medicine training programs. Trainees from the programs will be able to manage not only trauma patients but also those who are medically ill (Hardcastle & Oteng, 2011). In regions where resources are scarce for healthcare in general, secondary gains from the development of trauma system are valuable and cost-effective. The focus on enhancing trauma care and injury prevention is designed to strengthen the existing infrastructure and focuses on primary care and public health, known as a form of horizontal development.

It is important to understand that the key to addressing the ethical dilemma of trauma care development in LMIC is to identify and engage stakeholders of the agenda. With a bidirectional approach, everyone becomes a stakeholder at varying levels. Let us consider RTI, for example. With the recent rapid growth in the economies of many LMIC, the total number of motor vehicles has increased. However, traffic laws and regulations, such as speed bumps and stop signs, infrastructure to improve the road system, and public awareness of safety measures, such as safety belt and helmet use, have not caught up with this striking economic growth. As a result, RTIs remain the most frequent cause of injury-related deaths in LMICs. Each of these areas of improvement represents stakeholders in politics, business contractors, and individual citizens. As such, the bidirectional process of trauma care development needs to parallel improvements in infrastructure, education, public policy, and programmatic development while engaging all involved stakeholders. So how can we start to integrate these components?

There is no one-size-fits-all approach to trauma system development in LMIC. This is even more evident when straining inappropriately to fit an LMIC into an HIC model of trauma care (Callese et al., 2015). Recognition of a problem and detailed assessment can be supported through research. Hashmi et al. (2013) showed that implementing a trauma quality improvement (TQI) program in Karachi, Pakistan, reduced morbidity and mortality at the hospital level. Quality

improvement study is an area that is actively studied in HIC, and it should be considered in LMIC as well.

A panel discussion convened by the Fogarty International Center to address the global burden of injury and trauma identified five critical areas of research: epidemiology, basic science, prevention research, health services, and policy. Epidemiology helps identify the problem and allows the public sector to initiate trauma care; basic science research can enhance diagnostic and therapeutic interventions at the most fundamental level; prevention research is a well-recognized area in public health and is cost-effective, as previously mentioned; and health services and policy research can be supported by TQI programs and can gain the attention of policy makers at a higher level (Hofman, Primack, Keusch, & Hrynkow, 2005).

Research is a sustainable way to participate in trauma system development in LMIC. However, it is not an end-all and be-all solution. The most frequently cited problem with addressing the burden of trauma is the difficulty in collecting and organizing data. Research is also a rigorous academic practice that requires training in scientific methodologies, something that is not always available to clinicians abroad. Furthermore, despite the efforts required to produce studies, some may view such academic activities as out of touch from hands-on clinical practice. Our challenge remains to form lasting partnerships with LMIC to provide support for research while ensuring that the respective countries maintain ownership of their development. The development of research initiatives that are implemented in the country and then turned over to the country or stakeholders limits the perpetual need for interventions from outsiders and prevents doubts about sustainability. These studies must also be meaningful in a way that urges political stakeholders to mobilize available resources for trauma care and empowers members of the community to become active participants in the healthcare system. Integration of these areas will help identify and encourage other parties that have an interest in the improvement of trauma system to join the movement.

To minimize the likelihood of a true ethical dilemma and failure of the system, educational initiatives and public announcements of initiatives by all stakeholders should be ongoing. Transparency builds trust between all parties and facilitates information transfer, ensuring that all parties identify the same object in the box, i.e., a red cone, not a triangle or circle.

Clinical Pearls

- Successful trauma system development takes a bidirectional approach.
- This bidirectional approach involves empowering citizens from the bottom-up and developing systems from the top-down.
- Trauma system development should alert stakeholders at all levels to reach a mutually beneficial solution.

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Chapter 14

The Future of Injury Control Is Precise



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How do we envision the future of injury control?

Imagine the year is 2025. A 53-year-old male is shot in the chest outside a café in an affluent neighborhood in Los Angeles during a workplace altercation. Emergency medical systems (EMS) crews arrive at the scene within 4 minutes and, finding the patient pulseless, secure the airway, establish intravenous access, and initiate a massive transfusion. The patient is transferred to a nearby level 1 trauma center, where he is taken directly to a hybrid operating room, with multiple surgical and interventional radiology teams on standby. He requires a period of extracorporeal life support, therapeutic hypothermia, multidisciplinary damage control surgery, and multisystem life support. His ICU stay is complicated by sepsis, but human leukocyte antigen (HLA) DR testing reveals that his sepsis would be responsive to immunostimulation. The patient continues to respond to treatment and is eventually discharged home after a 49-day hospital stay. On the same day as his traumatic incident, in a low-income, high-density neighborhood across the city, multiple members of a young family are killed after a collision at an intersection causes a car to swerve into a bus stop. The incident is reported by the Times, but no further reports appear in subsequent days.

Every critically ill or injured person has the “right to the best medical care, according to the state of the art and not according to location, severity of injury or ability to pay.”
—R. Adams Cowley (Cited in UMMC Admin, 2016)

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Introduction

The past 50 years have seen the phenomenal rise of trauma systems. Our increasingly sophisticated understanding of the effects of injury at molecular, cellular, organ, human, and even societal levels has informed parallel advances in injury control that have included major breakthroughs in shock resuscitation, hemorrhage control, damage control, restoration of anatomic integrity, access to high-quality trauma care, and injury prevention. Successfully implemented systems of trauma care incorporating these advances have been shown to reduce injury mortality by 15–20% (Branas et al., 2005). It is not an exaggeration to say that the advent of trauma systems, which can be thought of as a comprehensive and systematic public health approach to injury control, has been “an astounding achievement of modern health care” (Ciesla, 2007).

Unfortunately, unlike other major public health success stories of the twentieth century, health-care and public health approaches to injury control have not yet come close to having a universal impact. Despite advances in trauma care and injury prevention, injury—including from war—still claims the lives of 5.1 million people worldwide each year (Norton & Kobusingye, 2013), destroys human potential more than any other health issue, and weakens the fabric of communities and societies. Marked disparities in injury risk and access to high-quality trauma care have persisted everywhere, in the face of the trauma system’s ideal that every critically injured patient has the right to the best care, regardless of socioeconomic status. New paradigms are needed to break out of this impasse between trauma systems with apparently diminishing returns, and a complex injury pandemic with seemingly intractable determinants.

In parallel with the rise of trauma systems, the past five decades have seen the emergence of two other transformative phenomena, with great, but as yet unexplored, implications for injury control. First, exponential increases in computing power, data storage capacity, data analytics, communication, and access to information have created data environments of unprecedented richness and potential. Second, the unlocking of the human genome has opened up previously unimagined opportunities to tailor diagnostic and therapeutic interventions to individual patients’ unique genetic profiles. These developments, which have paved the way for the new era of *precision medicine*, may lead to the next big breakthroughs in trauma care. New investments in precision medicine, however, which will focus on bringing tailored and sophisticated care to *individuals* could detract from ongoing efforts that view injury control as a means to improve the health of *populations*. The way that evolving trauma systems navigate the adoption of precision medicine era technologies will be a defining dilemma in the future of injury control. Should the next generation of advances in injury control focus on and invest scarce resources in potentially expensive precision approaches to *individual* trauma care, or should they continue to advance incremental approaches that address injury as a *population* health issue?

The Incremental Evolution of Trauma Systems

In the 1960s, an era of steady urbanization and urban sprawl, industrialization, escalations in road traffic, income inequality, civil unrest, and war, injury was a dreaded and ubiquitous presence in the lives of individuals and families across North America and around the world and was often seen as an inevitable tragedy. Trauma and violence were not widely viewed from scientific or public health perspectives. The publication of the National Academy of Sciences' *Accidental Death and Disability: The Neglected Disease of Modern Society* in 1966 marked a major turning point in our approach to injury control. Their statement that the "public apathy to the mounting toll from accidents must be transformed into an action program under strong leadership" (National Academy of Sciences, 1966) inspired a generation of surgeons, scientists, and health-care and professional organizations to do just that: transform the way society confronts injury. According to Avery Nathens, surgeons returning home from wars in Korea and Vietnam, "with their organizational and technical skills honed in combat, and the American College of Surgeons advocating reform and improvements of standards at home, gained a pre-eminent role in the care of injured patients" (Nathens, Brunet, & Maier, 2004). The nearly simultaneous recognition of injury and violence as modifiable public health issues and the increased capability of health-care systems to manage injury set the stage for a revolution in injury control.

Among a new generation of revolutionary trauma systems leaders was a Baltimore surgeon, R. Adams Cowley. He was an early proponent of the idea that trauma care occurs across a complex continuum composed of essential steps (that begin even before the moment of injury and span prehospital care, resuscitation, surgical care, and rehabilitation), each of which could be optimized. He was a champion of trauma's Golden Hour concept and the establishment of dedicated shock and trauma units, trauma centers, military-style helicopter emergency medical services, statewide emergency medical systems, and trauma registries for injury surveillance. These innovations inspired the American College of Surgeons Committee on Trauma (ACS-COT) *Resources for Optimal Care of the Injured Patient* (Rotondo, Cribari, & Smith, 2014), a publication that has disrupted the status quo of injury control and transformed individual, ad hoc approaches to injury control into strong, systemic, population-based approaches.

Injury, with complex determinants of risk and outcome, has proven to be an exceedingly difficult public health challenge. The ACS-COT champions a key insight, i.e., that injury control is most effectively accomplished in a public health framework that includes approaches to prevention, optimization of access to acute care, acute care itself, rehabilitation, and research. In each of these areas, the ACS-COT promotes a public health approach that includes a perpetual cycle of ongoing *assessment* of injury data and injury epidemiology, evidence-based *policy development*, and the ongoing *assurance* of efficacy of processes. These core functions are driven by the systematic collection and analysis of injury data in ACS-COT-mandated trauma registries.

This theme—*injury control as a continuous process that requires continuous assessment, policy development, and assurance*—gave rise to the modern trauma systems concept. A *trauma system* is defined as an organized and comprehensive public health response to injury within a specified geographic area that includes injury prevention, prehospital care, triage and transport, acute medical and surgical care, rehabilitation, education, and research (Norton & Kobusingye, 2013). In the trauma systems era, mortality from unintentional injury in the USA fell from 55 per 100,000 population in 1965 to 37.7 per 100,000 in 2004 as innovative injury prevention strategies were broadly implemented and access to sophisticated trauma systems within an hour of injury was provided to 84.1% of all Americans (Norton & Kobusingye, 2013). When the burden of injury is shared between acute care hospitals in inclusive and integrated systems of trauma care, outcomes get better. The most inclusive of trauma systems have shown the lowest odds of mortality (OR 0.77 in a population-based study comparing states with coordinated [inclusive] trauma systems against those with stand-alone trauma centers) (Utter et al., 2006).

Despite five decades of advances in the public health model of injury control, injury still claims more lives than HIV, tuberculosis, and malaria combined, over 5 million, and hospitalizes another 100 million people (Norton & Kobusingye, 2013). This persistent burden of injury is of great consequence: Each death and each major injury irrevocably destabilize families, communities, and nations. This burden persists even in the places where trauma systems first started: Baltimore hit an all-time high in homicides in 2017, with startlingly high vulnerability among African American communities (Ferkenhoff & Little, 2018). In Chicago, another point of origin of modern trauma systems, it is estimated that 39,000 people have been killed in the past six decades in acts of violence and that the number of murders has not fallen significantly despite increasingly capable trauma centers and trauma systems (Ferkenhoff & Little, 2018).

People in low- and middle-income countries (LMICs) sustain a disproportionate burden of injury: Of all deaths worldwide, 89% of trauma deaths occur in LMICs, as compared with 84% from all causes (Norton & Kobusingye, 2013). Injuries account for 12% of deaths in LMICs, but only 6% in high-income countries (Norton & Kobusingye, 2013). In Africa, high road traffic and violence-related injury rates make injury the second overall leading cause of disability and death (Norton & Kobusingye, 2013). Socioeconomic disparities in injury risk and in outcomes after injury have been documented in countless studies in both high- and low-income settings (Norton & Kobusingye, 2013). Regardless of the social determinants measured, including income, education, insurance status, race, ethnicity, urban geography, and rural geography, gradients in injury vulnerability have been seen, in both high- and low-income settings (Norton & Kobusingye, 2013).

Public health approaches to injury control may be beginning to fail, or at least to plateau, perhaps in part because trauma systems principles have been difficult to apply across populations where they are most needed. In practice, the concep-

tual public health model of trauma systems has been difficult to actualize because of limited access to resources for injury surveillance (and therefore to evidence-based injury prevention policy and trauma systems performance improvement) and because attention has been paid to competing public health priorities, such as infectious diseases in global health or cancer- or lifestyle-related illnesses in high-income settings. It is estimated that if all trauma centers in the USA could achieve “outcomes similar to those at the highest performing centers,” 100,000 lives could be saved in just over 5 years (Hashmi et al., 2016). On a global scale, this leveling of the playing field of access to trauma care would translate to 1.9 million lives saved every year (Mock, Joshipura, Arreola-Risa, & Quansah, 2012). This is a gap that modern trauma systems have so far failed to close. In the case of violence and trauma, after five decades of incremental progress of the public health model, it seems time for new transformations and even new revolutions.

The Promise of Precision Medicine

In 1965, Gordon Moore, a physicist, computer scientist, and co-founder of Intel Corporation, published a paper that observed that the number of transistors in an integrated circuit was doubling every year (Moore, 1965). This phenomenon predicted exponential increases in computing power and data storage capacity (and consequently human knowledge and productivity) over the next decades. The accompanying decrease in the cost of technology has meant that information technology tools have suddenly become more universally available, and more readily usable, including in health care. Electronic health records, for example, have created a new foundation of health-care data on which to base future quality improvement and scientific initiatives. Physiologic monitors, accessible information from diagnostic tests, registries that report health interventions and outcomes, and even wearable devices and social media have contributed to a health-care data environment of unprecedented richness and promise.

As phenotypic data and the experiences of health and disease accumulate on powerful digital platforms, genotypic data are also being unlocked on a vast scale. The sequencing of the human genome, a phenomenal achievement that once cost 95 million dollars and that is now available for less than one thousand dollars (Ramaswami, Bayer, & Galea, 2017), will touch off a new era in health care in which diagnostics and therapeutics will be uniquely targeted to individuals on the basis of genetic profile and in which the efficacy of therapies will be high and side effects low.

Better computing power will make it possible to link clinical data with genomic data; to make new connections between patients, clinicians, and investigators; and to create new insights and new breakthroughs for increasingly specific and precise problems. Successes of precision genetic approaches to refining the classification of

diseases, controlling infectious disease outbreaks, and treating advanced malignancies are being reported with increasing frequency. Precision medicine has captured the imagination of the medical community and the public and has drawn in billions of dollars of private and public investment.

The National Institutes of Health (NIH) defines precision medicine as “an approach to disease prevention and treatment that takes into account individual variability in genes, environment, and lifestyle to aid in the development of individualized care” (National Institutes of Health, 2018). It is the natural direction in which advances in health information technology, genomics, proteomics, and metabolomics and our commitment to the care of our *individual* patients will lead. The NIH admits that it will be a long journey before precision approaches to disease and prevention are widely validated, applied, and proven to change the trajectory of societal health. Still, precision medicine approaches are finding their way into clinical practice.

On January 20, 2015, during the State of the Union Address, the then President of the USA, Barack Obama, launched the Precision Medicine Initiative. It was a national recognition of and commitment to the idea that “prevention and treatment strategies that take individual variability into account” (Collins & Varmus, 2015) or “delivering the right treatment to at the right time, every time, to the right person” (Rubin, 2015) has great potential to improve societal health. The Initiative was an investment of 215 million dollars in “research that promises to accelerate biomedical discoveries and provide clinicians with new tools, knowledge, and therapies to select which treatments will work best for which patients” (Office of the Press Secretary, 2015). The idea was described as “visionary” (Collins & Varmus, 2015). Clinicians, scientists, and policy makers embraced a two-phase strategy, focusing on the application of new knowledge and capability in genomics, proteomics, metabolomics, and data science to the development of precise approaches, first in oncology and subsequently in a broader range of health and disease states.

However, enthusiasm and optimism for this investment were not universal. Public health scholars raised the possibility that investment of imagination and resources in precision medicine could leave opportunities to change health at the population level unexplored and undiscovered (Ramaswami et al., 2017). Focusing precisely on a few trees, the scientific community could lose the view of the forest. For example, while advances in genomics have helped us to identify people with specific vulnerabilities to developing cancer, the magnitude of the effect of precision cancer prevention is not well understood. If we could somehow identify everyone in the USA who could benefit from intervention from current tier 1 precision medicine interventions, we would have the opportunity of making a difference in two million lives (Ramaswami et al., 2017). Some of the people who would benefit from such interventions are people with the BRCA1 and BRCA 2 mutations, who have a lifetime risk of 65% and 45% of developing breast cancer, respectively; people with Lynch syndrome DNA mismatch repair mutations, who have a 40–80% lifetime risk of developing colon cancer; and people with familial hypercholesterolemia, who have a 32–52% risk of developing heart disease before age 60

(Ramaswami et al., 2017). This number, while impressive, represents a small proportion of morbidity and mortality in the USA—investments in the health of this population would have to be weighed against broader societal approaches to more common risks, including smoking and obesity.

The inherently narrow focus of precision medicine is further magnified by limited participation of marginalized populations in precision medicine research and by the high costs of precision diagnostic and therapeutic interventions. Populations that are vulnerable to the impact of the social determinants of health and that already shoulder a disproportionate burden of illness may be systematically excluded from the frontiers of precision medicine research.

Ramaswami et al. (2017) argue that there are four main limitations in the capacity of newly emerging precision medicine approaches to prevent illness:

1. Patients defined as high risk by genetic testing *may not alter modifiable high-risk behaviors*.
2. Persistent *disparities in access* to genetic testing or to indicated prevention or therapeutic interventions could limit the benefit of precision medicine approaches in high-risk populations.
3. The *cost-effectiveness* of precision medicine approaches to prevention and treatment is still unknown.
4. The *predictive ability* of genomic patterns in the context of multifactorial diseases with numerous environmental determinants is still unknown for most diseases, which is a problem because precision medicine relies on predictability of exposure and outcome.

Even if proponents of precision medicine could adequately address these limitations, which they may well do, the benefits of precision medicine will always remain within the context of the traditional health-care paradigm, and there is evidence from landmark studies that health care, even if universally available, does not substantially influence the health of societies. The Whitehall Studies of tens of thousands of British civil servants in the 1960s (and again in the 1980s) revealed that, even in a society where health care is considered to be universally accessible, there is a continuous gradient in health indicators, including mortality, with steadily declining health outcomes associated with lower socioeconomic status. In 1980, the Black Report noted “deeply rooted” health inequalities in British society and suggested that 30 years of welfare state and universal health care achieved little in reducing social inequality in health (Bayer & Galea, 2015). A 2013 report from the US National Research Council and the Institute of Medicine—*US Health in International Perspective: Shorter Lives Poorer Health*—concluded that Americans are at a disadvantage at every stage of life, i.e., birth outcomes, sexually transmitted infections, violence, road traffic injury, heart disease, and chronic lung disease, despite extremely high health-care expenditure (Woolf & Aron, 2013). Within the USA, these disadvantages are greatly magnified by high rates of poverty and income inequality, disparities in quality of education and access to health-care and social safety nets, and lower rates of upward mobility than in other high-income countries. In the face of these disparities, Bayer and Galea (2015) note that “clinical

intervention, however important, cannot remedy health inequalities” and that “decades of research have documented that health is determined by far more than health care.” According to Ramaswami et al. (2017), “the core public health concern is whether the new enthusiasm for targeted clinical intervention represents a profound distraction from population level challenges that demand resources and sustained scientific attention.”

These constraints raise concerns about the potential of investments in precision medicine to meaningfully change societal health. Meanwhile, *public health* measures promoting healthy eating and active living, blood pressure reduction, smoking cessation, and injury control have the potential to touch the lives of literally billions of people around the world, probably with greater cost-effectiveness.

An Ethical Dilemma

The tension between molecular- and population-based perspectives is well represented by trauma and violence. As trauma care moves toward precision medicine, opportunities to introduce simple population-based interventions to prevent injury or to extend what is already known about integrated systems of trauma care to vulnerable populations across the globe could be overshadowed. In other words, as trauma care for individuals gets more sophisticated and more complex, especially as it moves into the resource-intensive realms of predictive and precision medicine, does it distract us from our duties to our larger communities and societies? Many trauma care providers at the front lines of care of individual patients were initially inspired to pursue their careers to address trauma as a social issue but have wondered about how to reconcile high-tech care with the unchecked hardships and disparities among people in our own communities and around the world.

The unsustainability of the current trajectory of health care, which includes precision medicine as a major pathway of scientific advancement, has been considered in discussions of rationing and reduction of waste in health care (Brody, 2012; Fuchs & Milstein, 2011). In the USA, health-care spending, which already accounts for 18% of gross domestic product and drives a 3 trillion dollar industry, is projected to continue to grow unchecked because of expensive innovations and the widespread availability of private and public health insurance (Brody, 2012). Health-care providers working in this environment are acutely driven by the primacy of caring for individual patients while chronically aware of the heavy burden this care places on health-care systems and society.

The guiding documents of North American health care have, in some ways, encouraged us to embrace this tension. Advancing the health of society depends on the successful navigation of potentially competing values. The Code of Ethics of the Canadian Medical Association (CMA 2004), for example, recognizes that “physicians may experience tension between different ethical principles, between ethical and legal or regulatory requirements, or between their own ethical convictions and the demands of other parties,” but that their very first duty is to consider the well-

being of the patient. The code also goes on to say physicians must “[r]ecognize that community, society and the environment are important factors in the health of individual patients” and “[r]ecognize the profession’s responsibility to society in matters relating to public health, health education, environmental protection, legislation affecting the health or well-being of the community ...”

Similarly, the American College of Surgeons (ACS) Code of Professional Conduct holds the expectation that members of the ACS “[a]dvocate for strategies to improve individual and public health through communication with government, health care organizations, and industry” and “[w]ork with society to establish just, effective, and efficient distribution of health care resources” (American College of Surgeons, 2003). The Principles of Medical Ethics of the American Medical Association also supports the view. While these principles are clear that “[a] physician shall, while caring for a patient, regard responsibility to the patient as paramount,” they also specify that a physician “shall recognize a responsibility to participate in activities contributing to the improvement of the community and the betterment of public health” and “shall support access to medical care for all people” (American Medical Association, 2016).

How trauma teams and trauma centers navigate these dual priorities to individual patients and to the public is a fundamental question, especially at the dawn of the precision medicine era, that requires imagination and integrity. As always, this process will require health-care teams to be aware of how they allocate resources to individuals. This awareness is heightened as health care evolves from the care of individual patients by individual practitioners to the care of populations by teams and systems of care (Fuchs & Milstein, 2011). This has already been happening in trauma for decades, so, in some ways, trauma care is well prepared to maintain a societal perspective, even as diagnostic and therapeutic technologies rapidly advance. Trauma systems, and health care in general, also have an opportunity to avoid wasteful or non-beneficial interventions, which are estimated to account for 30% of health-care expenditure, and to focus more on quality, cost, and value (Brody, 2012). While precision medicine has been seen as an added stress on unsustainable health-care expenditure, it is possible that precision medicine perspectives and technologies could actually help to balance individual and societal approaches to health. Trauma systems are well positioned to lead this movement.

A Path Forward: Trauma and Precision Public Health

According to Bayer and Galea (2015), “whether and to what extent medical care has transformed morbidity and mortality patterns at a population level and what contribution, if any, it has made to the well-being and life expectancy of the least-advantaged people have been matters of contention for more than a century.” Meanwhile, Richter (2001) sees close to 40,000 road deaths annually in the USA as a failure of injury prevention and public health. These glass ceilings in the progress of both medical care and public health could be overcome by seeing these two

camps as complementary and continuous and through the imaginative application of precision medicine-era scientific advances.

Khoury describes *precision public health* as follows: “If precision medicine is about providing the right treatment to the right patient at the right time, precision public health can be simply viewed as providing the right intervention to the right population at the right time” (Khoury, Iademarco, & Riley, 2016). More precise strategies to optimize population health may rest on the detailed analyses of the experiences of individuals. In other words, the engine for disruption in models of *both* health care and public health may lie precisely in insights gleaned at the intersection of individual patients and health-care systems.

Khoury et al. (2016) see several priorities for the development of precision public health, including the increased engagement of multidisciplinary teams, a shift in focus from prevention to treatment, and the modernization of information systems and public health surveillance. Movements corresponding to these priorities are already underway in trauma systems.

The evolution of multidisciplinary trauma care Trauma systems recognized early that successful trauma care depends on the seamless integration of inputs from diverse teams that include trauma surgeons and nurses, emergency physicians, neurosurgeons, orthopedic surgeons, radiologists, physiotherapists, social workers, and a host of other care providers. In the twenty-first century, this team includes patients, families, and communities—as key reporters of outcomes and essential partners—and policy makers, economists, and administrators to ensure that systems are both well resourced and cost-effective. This transition between a model of single providers caring for individual patients to teams and systems of providers providing care for communities and society has driven progress in trauma care and opened fresh opportunities for growth. Broadening perspectives on trauma care have moved trauma systems from a stage of *technical advancements* (prehospital care, trauma surgery, critical care) that characterized the early days of trauma surgery development to a stage of *standardization of procedures* (that drive current efforts to generalize performance improvement benchmarks, such as the American College of Surgeons Trauma Quality Improvement Program; American College of Surgeons, 2018) and, finally, to a new stage of learning health systems and *high-reliability organizing* that shift organizational culture toward teamwork and coordination of care (Ghaferi, Myers, Sutcliffe, & Pronovost, 2017). Placing patients at the center of well-integrated systems of care opens opportunities to measure and refine the quality and costs (or value) of care and empowers health systems to use insights about individual patients to address societal issues such as health-care access and containment of health-care expenditure (Porter, Lee, Christensen, et al., 2013).

Precision injury prevention The steady volume of patients being admitted to trauma centers around the world can provide a stream of data that characterize the vulnerability of patients and populations to injury and its complications. For example, hot spot analyses of the spatial distribution of pedestrian trauma in cities can characterize high-risk intersections that inform specific education and traffic calming initiatives (Cinnamon, Schuurman, & Crooks, 2008). If these data

visualizations and analyses that use patient level data are done in real time, they have the potential to create dynamic and precise injury prevention policy. The natural extension of this application of patient-level experience in trauma centers to population health interventions is to more thoroughly integrate trauma centers into the lives of the communities that surround them. A steady exchange of ideas and experiences between trauma centers and at-risk communities may identify strategies for injury prevention, better injury care, and more effective reintegration of injury patients into their homes and society. Considering trauma centers not as bricks and mortar ivory towers, but as hubs of multidisciplinary community engagement with difficult social and public health problems, blurs the distinction between health care and public health and creates new opportunities for insight and action. This is currently happening at the University of Chicago Medical Center (Gross, 2018), where community engagement catalyzed the recent creation of a trauma center in the heart of Chicago's Southside, a community shouldering a crushing burden of violence and injury and where considerations of public health and, perhaps, precision public health will form a holistic approach to injury control that learns something about both medical care and injury prevention from every patient and family that come through the doors.

Precise insights from the experience and care of trauma patients, linked to advanced data collection and analysis strategies, may re-energize and re-launch traditional public health approaches to injury control, such as those outlined by William Haddon in the 1970s. Haddon described a framework to understand the determinants of injury risk. The Haddon Matrix characterizes motor vehicle crashes, for example, into phases: pre-crash, crash, and post-crash. Within each phase, risk can be thought of as being governed by human factors (alcohol use), vehicle and equipment factors (seatbelts, airbags, automobile design), and environmental factors (highway design, weather). Violence-related injury can also be conceptualized in this framework as having pre-event, event, and post-event phases, with human, vector, and environmental determinants acting in each phase. The matrix organizes these determinants to give us insights about where there may be opportunities for action (some determinants may be more modifiable than others). In the epigenetics era, where interactions between the environment and gene expression are increasingly being identified, the modifiability of risk factors in the pre-event, event, and post-event phases holds unprecedented promise. Modification of just one or two determinants or risk factors could completely change the implications of a traumatic event or prevent it altogether. Precision public health approaches with access to trauma center data would be able to build an actionable Haddon Matrix for every trauma patient and every at-risk population. Doing this would require a focus on the point of trauma care, the moment that unites injured patients with health-care teams.

Modernization of injury surveillance Precision in both health care (Porter et al., 2013) and public health (Khoury et al., 2016) will fundamentally depend on the collection, analysis, and reporting of high-quality data. This injury surveillance, in turn, will depend on the development and adoption of enabling technologies. Since their inception, trauma systems have been built on a strong foundation of data.

Trauma registries are considered to be essential aspects of modern trauma systems. While we owe much of our knowledge about injury to trauma registries, these registries have limitations. The high cost of data acquisition means that the number of fields is limited and not easily adapted to day-to-day needs. Most trauma registries have a 3- to 6-month lag in data collection, and data are not analyzed immediately, which diminishes the agility and impact of registry data. Insightful quality improvement and research often requires linkages between trauma registries and other sources of data, and linkage is limited by administrative and logistical issues and the quality of data in other databases. Trauma registries, like all registries, can only answer the questions they were designed to answer, and, for the most part, they were not designed to answer questions on the social determinants of health.

However, new, point-of-care technologies and precision medicine era advances in data science may transform data environments available to injury control efforts. In trauma, this has been achieved in a busy trauma center environment, where trauma teams use an iPad-based software application to document trauma care and wirelessly populate an electronic trauma registry in real time (Zargarani et al., 2018). Once digitized, data can be streamed into visualization and analytics algorithms to optimize processes of care and to identify vulnerabilities to injury risk and to adverse outcomes after injury. As with genotypic data in cancer screening, diagnosis, and treatment, precise *phenotypic* data in injury can be integrated and used to diminish risk and enhance prevention in vulnerable individuals and populations. Point-of-care data collection was found to be user friendly, fast, and complete, with field completion rates that jumped, in some cases, from 35% in the paper era to 95% (Zargarani et al., 2018). Point-of-care-entered data were available in real time, organized, and, for the most part, ready for analysis. Despite being entered at the point of care by clinicians and not data analysts, the data were found to be robust enough to model survival with multivariate models and even machine learning techniques, and predictions generated from clinician data entry were as good or better than predictions based on manually collected data by trained data abstractors (Zargarani et al., 2018). The implication here is important, i.e., that data generated at the point of care in real time and entered by clinicians during the course of clinical work could be used to provide insights about the trauma system and, by extension, engage frontline clinicians more broadly with the social determinants of health.

Of course, applications of technology for this purpose will have to account for issues of data security, patient privacy, and cost. High-resolution analyses, while important for evolving precision injury control strategies, have the potential to compromise the confidentiality of individual patient data points. Health-care data is sensitive and has the potential to affect employment, insurability, and autonomy. This is a concern that must be met with the greatest care. Strategies to protect and de-identify data are already well known and must be weighed against the collective utility of clinical and public health insights that can be derived from the linkage and analysis of big, high-resolution datasets. The cost of continuous high-volume data collection and analysis is also not trivial. Development and maintenance of technology, and the serial analytics that are required to drive culture change, are

labor-intensive and expensive. In many instances, this work has required public-private partnerships, where private contributions may be profit driven and where protection and judicious use of data are especially critical.

Conclusion

Moving forward with injury control depends on the reduction of disparities in the determinants of health and on the promotion of social justice. This means detailed attention to the interplay of age, race, language, gender, comorbidity, education, income, occupation, geography, housing stability, and a spectrum of other factors that impact individuals and communities in the pre-event, event, and post-event phases of the continuum of trauma. Doing this may require diverse input and a willingness to embrace and address complexity. This is where synergies between trauma systems' public health perspectives and precision medicine methods will become useful. Public health and precision medicine can be complementary strategies. From precision medicine, public health can adapt approaches to data collection, storage, security, linkage, and analysis. It can target primary, secondary, and tertiary prevention policies to specific segments of diverse populations where they can be expected to have the most impact and benefit. From public health, precision medicine can learn that to have a true impact on society, genetic and other individual-level data must be linked to specific knowledge of the environment and of social determinants. It can remember to be inclusive in its selection of cohort populations and in the dissemination of its findings and therapies.

It is an exciting time right now, when technological revolutions can be applied to make meaningful improvements in societal health. The apparent ethics-related tension between individual and societal duties mentioned in our medical ethics frameworks can be resolved if we constantly recognize that what we see on the front lines of trauma is an individual and a societal issue. In the words of Martin Luther King Jr., "[i]njustice anywhere is a threat to justice everywhere"; or of Rosemary Brown, a Canadian politician, "until all of us have made it, none of us has made it." In the age of big data, these words hold more potential than ever.

Consider an alternate 2025. Years of trauma center injury surveillance and data linkage with police, insurance, transportation, and social media databases, along with concurrent data visualizations and analyses, have generated dynamic hot spot maps for various mechanisms of injury. Computer algorithms designed to use near misses (single-system injuries or noninjury collisions) to model the probability of severe pedestrian trauma identify a street corner with an adjacent bus stop to have crossed the threshold for a 50% annual risk of pedestrian trauma. City workers place traffic calming features, including stop signs, and move the bus stop further down the street. No pedestrian incidents are reported at that location for the next several years. As for gun violence, the rates have been falling for years, based on data-driven advocacy for gun regulation, but trauma centers are still called on to make the occasional big save.

Clinical Pearls

- Trauma systems have evolved to bring state-of-the-art care to severely injured patients, in a systematic, public health approach to global injury control.
- Precision medicine harnesses exponential developments in data science and in genomics, to account for genetics, environment, and lifestyle in the creation of individualized, patient-specific approaches to the prevention and treatment of disease.
- Both public health and precision medicine approaches to societal health have faced criticism. Trauma systems-based public health approaches to injury control have failed to reduce the staggering global burden of injury, while precision medicine approaches within a health-care paradigm can be prohibitively expensive and have not been shown to have a significant impact on societal health.
- Combining trauma systems and precision medicine holds the promise of creating *precision public health* approaches to injury control that harness detailed, individual-level data from trauma centers and rapid analytics, to inform dynamic, patient and community-driven health-care and injury prevention policy.
- Trauma care providers on the front lines of trauma systems in low- and high-income settings can be empowered by the idea that the work they are doing and the lessons they are learning from individual episodes of care can be applied at the community and public health levels, using the modern perspectives and tools of precision medicine, in an ongoing, evidence-based fight to control the devastating global burden of injury.

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Chapter 15

Ethical Issues in Neurotrauma



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Introduction

Neurotrauma is the field of medicine that treats and prevents serious injuries to the neural axis, including the brain, spinal cord, and peripheral nerves. Caring for any patient with a sudden, devastating injury raises many ethical questions, but ethical issues and concerns are imperative in the context of a brain injury, when the cognitive and sensory input received and processed by a patient may be significantly impaired.

This chapter focuses on the unique ethical issues surrounding caring for patients with a neurotraumatic injury and on sensitive issues related to the prevention of neurotrauma and the recovery process after an injury.

Neurotrauma Injury Prevention

The topic of prevention is ripe with ethical issues. We can compartmentalize neurotraumatic injuries into several categories: sports injuries (concussions and spinal cord injuries related to organized sports play), road-related trauma (motorcycle, motor vehicle, all-terrain vehicles, bicycle, and pedestrian trauma), violent traumatic injury (gunshot wounds to the brain or spinal cord, knife injuries, etc.), or work-related injuries (falls from scaffolding, electrocution, etc.). These basic categories may help us approach our discussion of prevention efforts.

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Sports Injuries in the Young

Sports injuries pose several ethical quandaries. In sports such as football, lacrosse, soccer, or rugby, children—who for our discussion will be defined as young people aged 18 years or below—often return to play after a head injury, which may have implications for both the children and their parents. For clinicians managing these young patients, the pressure imposed by parents to encourage return to play—particularly if the child has been identified as a standout athlete in pursuit of a college scholarship—can be significant. For the child, too, family pressure (“this is the only way we can afford college”) can impose psychological distress. The child is the patient; however, acting in his or her best interest is ultimately the responsibility of the physician. In such clinical situations, given the absence of firm clinical guidelines specifying criteria for when return to play is safe, standard clinical practice is to exercise caution and advise against return to play for children with multiple, repetitive head injuries. Even a singular concussive event of moderate to severe intensity can be a reason for a clinician to refuse to allow a child to return to play indefinitely. Obviously, each clinical case is unique. Each child with a sports-related head injury should receive a thorough neurological assessment and be followed for cognitive sequelae by a physician who understands brain injury. Another question is whether the risk of chronic traumatic encephalopathy (CTE) should be discussed. This condition lacks clear clinical criteria for diagnosis, and data are conflicting regarding the incidence and possible mechanism/causation, including repetitive head injury, in nonprofessional athletes (Giza et al., 2013). Discussing this condition, which has garnered tremendous lay press attention, may inappropriately raise fears among parents and athletes, despite the lack of evidence-based information (Gardner, Iverson, & McCrory, 2014). It is important for practitioners to recognize the pressure that being “pulled out of the game” may impose on children or their families. Having a frank discussion with the family about the long-term potential for harm secondary to repeated head injuries, and also raising the issue of college and other pathways to make higher education affordable, may allay certain familial worries. Ethics dictate treating the child patient before you, but understanding and recognizing key family dynamics will help shape your discussion and allow you to manage the overall situation.

Motorcycles and Helmets

Mandatory helmet laws have been debated in multiple states. As of September 2018, 19 states and the District of Columbia require all motorcyclists to wear a helmet (“universal helmet law”); 28 states have a helmet law in place, but only for some types of motorcyclists (Insurance Institute for Highway Safety, 2018). Three states have no motorcycle helmet use law.

The evolution of state motorcycle helmet laws is an interesting journey with lessons for public health officials and ethics scholars. In 1965, the publication of “Unsafe at Any Speed,” Ralph Nader’s expose of United States’ auto industry vehicle safety standards (Nader, 1965), prompted the 1966 National Highway Safety Act to withhold federal funding for highway safety programs to states that chose not to adopt mandatory motorcycle helmet laws within a specific time period (Jones & Bayer, 2007). At the same time, a movement was taking hold within the public health community to move beyond the control and treatment of infectious diseases and to also prevent “disability and postponement of untimely death” (Rutstein, 1965).

Motorcycle enthusiasts banded together. The culture of independence, rebellion, and machismo and the outlaw culture supported by popular culture in movies such as *Easy Rider* (1969), *The Wild One* (1953), and *Rebel Without a Cause* (1955) fueled the allure of riding one’s motorcycle—helmet-free—on the highway or open road. Many motorcycle rider groups have advocated against mandatory helmet laws, stating that forced use of a helmet infringes on their individual rights and limits their personal autonomy. They argue that what they decide to do with their person is up to them, and if they should be in an accident, they will personally bear the consequences. Although there are data to suggest that for certain types of injuries, depending upon the speed of impact and type of vehicle, helmets can confer a benefit, particularly in terms of mortality, these groups state that the choice of whether to wear a helmet should be left up to the individual rider. Several state legislatures and public safety groups, however, have argued that because a rider involved in a moderate or severe motorcycle accident is often faced with weeks to months in the hospital, long-term or permanent disability, loss of work, and staggering medical bills, ultimately necessitating public assistance, the decision whether to wear a helmet does not solely affect the rider but also challenges the public, the taxpayer, and the healthcare system as a whole. This line of advocacy holds that if a certain public health intervention—such as helmet use—can confer improved outcomes, it should be mandated.

The ethical boundaries of public health interventions and personal rights—whether regarding seatbelts, bicycle helmets, or gun laws—are not unique to neurotrauma. Given the number of neurotraumatic injuries secondary to motorcycle accidents, however, this ethical challenge warrants special mention. Physicians who treat patients who are motorcycle riders can offer education on the benefits of helmet use and also information about which helmets confer the best protection (such information is available online through official state and federal highway public safety sites). For patients who have suffered multiple motorcycle accidents, discussions that involve the family (of course, with the patient’s consent) and focus on how to prevent additional trauma can help promote healthful behaviors.

Treating a Patient with Neurotrauma

Informed Consent

In patients in need of neurosurgical intervention after an injury, the issue of providing informed consent can be an ethical challenge. Even a patient with a mild traumatic brain injury may experience delays in cognitive processing and working memory dysfunction and may acutely have distracting conditions, such as a headache or light sensitivity, that make it difficult for them to pay attention to complex details (Mayo, Scarapicchia, Robinson, & Gawryluk, 2018). In patients with a moderate or severe traumatic brain injury, consent can be obtained from a family member or designated proxy, assuming that such a person can be found rapidly in the case of a traumatic injury requiring emergent intervention. Emergency consent decrees in most hospitals allow patients to receive life-sustaining intervention in emergency situations in which family members or a proxy cannot be identified in a timely fashion. When patients have a mild traumatic brain injury, attempts should be made to discuss clinical information with family or a proxy present. If this is not an option, before patients are discharged, staff should ensure that they have access to written information on their clinical course and follow-up care and contact information for the care team. Concussions can pose a difficult clinical situation because the patient may appear well enough to carry out a conversation and provide details of his or her medical history, but this level of alertness may fluctuate, so the practitioner is advised to be cognizant of this and provide multiple avenues (verbal, written) for the patient to absorb information.

Ethics of Dealing with Patients in an Altered State of Consciousness

If patients suffer a devastating cranial trauma and survive the initial injury and resuscitative efforts, they may linger in a state of depressed consciousness, such as a coma, for a period of days, weeks, months, or even indefinitely. Patients with severely compromised brainstem function may make spontaneous noises or display reflexive movements, such as spontaneous eye opening, random lower or upper extremity movements, and oral automatisms, which can be disturbing for families (Giacino et al., 2002). Because the movements they witness might seem to be at odds with the stated prognosis, it can be difficult for families to determine how best to care for patients who have no hope of a meaningful neurologic recovery and to decide whether to continue aggressive treatment. For a family, withdrawing ventilator or feeding support from a loved one may feel cruel or inhumane, while the converse, i.e., continuing to ventilate a body that is not capable of independent living, may also feel cruel and inhumane. For families, frequent and repet-

itive education may be helpful to improve their understanding of the movements they may witness in a loved one and what these movements may mean. It is also important that when communicating with families, staff use plain language that can be understood. Technical jargon can be confusing and bewildering; however, simplified language meant to help translate understanding may be similarly confusing for families. For instance, when multiple caregivers use terms such as “brain death,” “minimally conscious state,” or “coma,” families often struggle to understand how these conditions differ and what the prognoses are (Kompanje, 2015). Terminology matters. Telling a family that a patient has no meaningful brainstem function and no hope for independent movement seemingly contradicts the patient’s reflexive leg movement that the family observes. It can be difficult for families to understand why these movements do not change the prognosis, and this lack of understanding may negatively affect the relationship between the patient/family and physician. Physicians are advised to be cognizant of this and, increasingly, of the multiple teams and practitioners who may use conflicting descriptions for conditions such as brain death. A family meeting, with all the treating disciplines in the room and one lead physician taking charge by explaining what the patient’s neurologic state and prognosis are, may help alleviate these mixed messages. Confusing descriptions make it difficult for the family to prognosticate and make decisions on behalf of their loved one. Consistency in communication can do much to alleviate this.

Importantly, our discussions with families about loved ones with moderate or significant traumatic brain injury is more than a matter of language. Our understanding of semiconscious or minimally conscious states continues to evolve rapidly. As imaging modalities improve, for instance, we learn of functional MRI studies showing “activity” in the cortices of patients who clinically are moribund in a comatose state (Aubinet et al., 2018). But what does this actually mean? Activity seen on an image does not necessarily correlate with a patient’s function or ability to engage in meaningful activity. Translating for patients’ families the information and headlines they read on a weekly basis online or in the lay press can be daunting. “Breakthroughs” heralded through sensationalized and often poorly worded headlines may offer families false hope about the survivability and recovery capacity of their loved one. Take, for instance, the much-publicized notion of performing a brain transplant. While innovation to promote neuronal recovery and fuel novel discovery should be encouraged, this proposed intervention does not have evidence to support its use. The associated media hype confused several of my patients’ families and raised false hopes because it led them to incorrectly assume that the technique existed and that brain transplants could be performed. Some families that I worked with wanted to delay interventions or goals of care decision-making because of the promise of pursuing a brain transplant for their loved one. Educating families and providing a dose of realism may not only shatter their hopes but may also undermine the patient-physician relationship because families may have unstated worries that the physician does not understand the latest medical interventions or is resistant to trying innovative solutions.

Wishes of the Patient

When a moribund patient with a severe head injury arrives at an emergency department and there is need for emergent, life-sustaining intervention, attempts are made to contact the family. In certain situations, however, the family cannot readily be identified or contacted, or the life-threatening nature of the situation requires immediate intervention and stabilization, necessitating intervention with emergency consent. In situations in which the family or a designated proxy is readily available to provide informed consent, and/or the patient has a clearly stated advance directive, physicians can discuss whether life-sustaining treatment should be offered. For instance, an elderly patient living in a nursing home who has advanced medical comorbidities and suffers a fall (and who may also be on an anticoagulant) may have previously discussed with family members the desire to decline care involving “heroic measures.” This situation is not as straightforward as it may appear. First, how can neurologic prognosis be predicted accurately? There are some prognostic tools, such as the CRASH (Corticosteroid Randomization After Significant Head injury) and IMPACT (International Mission for Prognosis and Analysis of Clinical Trials in Traumatic Brain Injury) scores, which suggest the statistical probability of morbidity and mortality at specific time points after a trauma, but no one has a crystal ball through which to predict the future (Castano-Leon et al., 2016). These instruments are helpful for a specific type of patient after a specific type of traumatic injury, but when such tools are applied to other patients—of different ages and different injury types—the accuracy and validity of the results are dubious. Second, the level of impairment that a patient may experience after recovery from a neurotraumatic injury (for instance, requiring nursing home care if the patient was once independent) may also be difficult to assess at the time of injury. If the injury is severe, this type of prognostication may be simpler than if the injury is moderate or mild because more evidence is available for severe neurotraumatic injuries. Third, it is challenging for families to make a decision on behalf of loved ones, in particular if they have not had a frank discussion with them about end-of-life wishes. Having the ultimate responsibility for someone else can be daunting for any individual, particularly if the decision is whether to withdraw life-sustaining care. Situations in which a healthcare proxy does not feel confident that he or she had a thorough discussion with the patient and can thus confidently make a decision on their behalf can lead to tremendous angst and may create a rift within the larger family unit. Decisions about end-of-life care and withdrawal of care most often involve several conversations with the family and represent an opportunity for the family to reflect and discuss. Physicians can thereby reassure families that they recognize and appreciate their struggle and understand that healthcare decision-making is not easy in any circumstance and is particularly difficult in end-of-life situations.

Suicide Resuscitation

When a patient arrives at an emergency room after a self-inflicted injury in the context of a suicide attempt, such as a gunshot wound to the head or a hanging injury that has resulted in cervico-axial dislocation, physicians immediately perform resuscitation and life-sustaining interventions. Many of these patients have psychiatric disorders, such as depression, and may have attempted suicide in the past. Practitioners may struggle with the ethics of performing life-sustaining treatment in patients who have made it clear through their actions or a written note that they want to end their life (Venkat & Drori, 2014). Does this suicide attempt represent the patient's autonomous decision? Or does the patient have a mental illness, such as depression, for which treatment can be provided so that the desire to end life might change? How does the physician know whether the patient was free from the influence of drugs or alcohol when attempting suicide? In such a situation, performing aggressive resuscitation seems to go against the patient's wishes; however, the absence of immediately available information regarding confounding factors that may have influenced a suicide attempt compels most physicians to attempt to save the patient's life. Surrogate decision-makers, such as families or designated proxies, may also struggle with the decision whether resuscitative efforts should be attempted after a suicide attempt. In these situations, to help alleviate the sadness and frustration associated with the suicide attempt, practitioners are advised to lead multidisciplinary conferences with medical decision-makers and families that involve colleagues from psychiatry and social work and to redirect the family toward making decisions in line with the patient's wishes. In patients who have an intractable psychiatric disorder or who have made multiple self-harm attempts, aggressive medical intervention may be in opposition to the desires of the patient and family, and these situations often require multiple conversations and time for decision-makers to feel comfortable with end-of-life decision-making (Brown, Elliott, & Paine, 2013).

Adherence to Guidelines

Several groups, including the Brain Trauma Foundation and American Association of Neurological Surgeons/Congress of Neurological Surgeons, have published treatment guidelines for cranial and spine trauma (Carney et al., 2017; Hadley & Walters, 2013). The evidence behind each of the guidelines varies considerably in terms of the strength of the supporting data. For instance, several head injury guidelines recommend against prophylactic hypothermia in case of severe traumatic brain injury; however, a trial is currently underway to study the impact of cooling proto-

cols on long-term outcome and survival. While the notion of “evidence-based medicine” and “following guidelines” seems straightforward at first glance, it is important to remember that strict adherence to guidelines—especially guidelines substantiated by weak evidence, such as Level II or Level III evidence—does not offer room for innovation or for trialing new clinical interventions that have been observed to be effective in other fields. Strict adherence to guidelines without introspection and periodic questioning of the assumptions underlying each guideline may inadvertently hamper patient outcomes in the long term. From an ethical standpoint, medical innovation demands a level of comfort with challenging the “norm” through rigorous scientific study and continual skepticism. We cannot take solace in “following the guideline.” Instead, the onus is on physicians to continually study the data and assumptions underlying guidelines and to raise questions on the basis of experimental and clinical research.

Pediatric Head Trauma

Neurotraumatic injuries in children can raise additional ethical questions. In situations of suspected child abuse, the multidisciplinary team—consisting of social workers, pediatricians, and traumatologists—must exercise additional caution when they examine the child and closely monitor child-parent interactions. Beyond the clinical situation, parents are involved in making decisions for a child, whether or not the child has the awareness and attentiveness to understand the injury and what treatment needs to occur. In adolescents, relinquishing this decision-making to parents, especially if as the parents’ decision is at odds with the adolescent’s wishes, can lead to frustration and concern (Olszewski & Goldkind, 2018). This situation is not unique to neurotrauma but can affect all patients we treat.

Moral Issues Around Craniocervical Trauma

Craniocervical injuries, which may occur as a result of a high-speed motor vehicle or motorcycle accident, can be challenging to manage. Patients may have intact or mildly impaired cognitive function, but may require ventilator support to live because of a high spinal cord injury. This can be devastating to patients who retain awareness, perception, and central processing but lack the ability to move or control their body. In these rare clinical situations, the patient and family are often consulted because the patient remains at high risk for pathology related to remaining ventilated and being sedentary. After a thorough family discussion, and after time, a patient may elect to have care withdrawn if life in such a state is unbearable (Spike,

2011). This decision may raise ethical quandaries for the physician and treating team (Napier, 2014). Ultimately, respecting the autonomous, informed decision-making of the patient should serve as clinical guidance.

Neurotraumatic Injury Recovery

Each new day seems to bring novel discoveries that push the frontiers of science in terms of recovery from neurotraumatic injuries. Recently, several groups have published preliminary findings or proposed studies on the use of deep brain stimulation techniques to promote arousal in comatose, brain-injured patients; peripheral nerve stimulators to modulate perfusion in brain-injured patients; and transcranial magnetic stimulation to modulate functional response in brain-injured patients (Kundu, Brock, Englot, Butson, & Rolston, 2018; Shi, Flanagan, & Samadani, 2013; Shin et al., 2018). Each of these novel, innovative scientific lines of inquiry, brings with it tremendous hope that neurologic function can be restored in neurologically devastated patients; however, the use of external modulatory interventions, such as deep brain stimulation, which uses electrical impulses to stimulate neuronal discharge through mechanisms that remain elusive, raises concerns as to whether human interventions are restoring function or manipulating or inducing activity. Because the mechanism of action through which cortical stimulation influences neuronal activity is unclear, the neuroethics of such stimulation can be challenging. In the context of the brain-injured patient, who cannot describe the effects that stimulation causes, should we be experimenting with invasive modalities with unclear mechanisms of action? Can we ethically treat vegetative patients with whom we are unable to communicate? How do we forge ahead with unique technologies and advance innovation when we may not fully understand the mechanism at play for each of our interventions? Ethicists may pose these and other questions. But for the physicians and caregivers who care for patients with devastating neurologic injuries—and work with families—the devastating nature of the injury and the hopelessness of a future without recovery fuel a desire for continued experimentation and iterative learning and a zeal to participate in trials with the chance of a novel discovery that may offer hope.

Conclusion

Treating neurotrauma patients raises a spectrum of ethical quandaries, some of which are unique to patients with traumatic brain or spinal cord injuries and some of which are ubiquitous across medicine. Recognizing the ethical issues and

approaching patients and families through an ethically sensitive lens can help improve quality of care and the dynamics within the relationship between the patient/family and physician.

Clinical Pearls

- Communicate clearly and use as little jargon as possible. Understand and try to use the same explanations across treating teams, for instance, when discussing concepts such as “minimally conscious state,” “persistent vegetative state,” or “brain death.”
- Recognize that patients with even a “mild” traumatic brain injury may have altered cognitive processing and sensory issues that might impair their ability to understand and fully consent to medical interventions.
- In all contacts with patients, whether inside or outside trauma settings, encourage them to discuss their end-of-life goals and wishes with family members and to designate a healthcare proxy. This may alleviate the tremendous burdens placed on families when they have to make decisions in difficult, life-threatening situations.
- Be aware of a patient’s autonomy and how this may be at odds with efforts for public health interventions or policy.

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Part III
Additional Ethical Concerns Relating
to Violence and Trauma

Chapter 16

The Evolution of Transfusion Therapy in Trauma



Colin H. Murphy, John B. Holcomb, and John R. Hess

Historic Background

This chapter focuses on the relationship between blood banking and trauma care, with an emphasis on the 100 years of history that led us to current ideas about appropriate therapy.

There are two case reports of successful blood transfusions in the American Civil War, before the recognition of blood types or transfusion-transmitted diseases and before the existence of anticoagulants and standard methods of collecting and transfusing blood. Half a century later, after Landsteiner had discovered the ABO blood group system in 1900 (Landsteiner, 1900), Ottenberg and Kaliski had shown that cross-matching prevented most major transfusion reactions in 1913 (Ottenberg & Kaliski, 1913), and Lee and Vincent had reported that citrate was a useful anticoagulant for human blood in 1914 (Lee & Vincent, 1914); it was possible for Robertson, an American Army officer serving in World War I with the Harvard Medical Unit, to build the first modern transfusion service. He collected universal donor group “O” blood in citrated bottles and gave it to injured soldiers triaged as too deeply in shock to benefit from surgery without resuscitation (Robertson, 1918). The British Army’s Medical History of the Great War called Robertson’s blood transfusion system the most important medical advance of the war.

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The military logistic effort to collect large numbers of units of blood collapsed at the end of World War I, but the practice was revived in the late 1930s at the Mayo Clinic, in the Spanish Civil War, and at the University of Chicago. These early blood bank systems were limited to keeping whole blood for a few days because of the low glucose content of normal donor blood. Adding extra glucose to sterile citrate was associated with a high rate of bacterial contamination, and attempts to autoclave solutions of citrate and glucose resulted in caramelization of the sugar. These problems were not solved until the middle of World War II. With sterile acid citrate dextrose (ACD) as an anticoagulant and nutrient, however, the USA collected over 13,000,000 pints of 3-week whole blood and got them to soldiers in the field in Europe and the Pacific. General Douglas Kendrick's classic *Blood Program in World War II* provides over 800 pages of details on the national blood program in World War II and Korea (Kendrick, 1964).

The Vietnam War went on for almost a decade and corresponded in time with the development of plastic blood bags and blood fractionation to make blood components: red blood cells (RBCs), fresh frozen plasma (FFP), and platelets. Components were important because cancer therapy required large numbers of platelets, and hemophilic patients needed plasma and plasma derivatives. It was in this context that modern trauma care began in new regional trauma centers in the late 1960s.

The American College of Surgeons established Advanced Trauma Life Support (ATLS) guidelines, first published in 1982, which advised delaying administration of plasma and using crystalloid fluids as the primary volume expander during trauma resuscitation. Plasma was kept frozen until patients were typed and had some laboratory coagulation irregularity that justified thawing plasma units from a limited supply. This guideline was given in conjunction with efforts to standardize physician and surgeon training and ensure competence in commonly used clinical skills, such as airway management, diagnosis of tension pneumothorax, and surgical interventions to manage bleeding. These changes resulted in a higher standard of care throughout the growing trauma system but also codified crystalloid and RBC resuscitation followed by laboratory-directed administration of hemostatic components.

Despite these systemic advances, translational trauma science was slow to materialize. Large grants given by the National Institutes of Health resulted in profound steps forward in our understanding of molecular biology and the causes of cancer and viral diseases, including the discovery of human oncogenes and immunodeficiency viruses, and in the prevention of heart attacks by addressing the deleterious effects of smoking, hypertension, and cholesterol. Without a National Institute of Trauma, scientific investigation into trauma and hemorrhagic shock was comparatively underfunded and had no national guiding organizational principles, although reducing trauma by making cars and highways and homes and workplaces safer did become a national goal. The achievement of no commercial airline flight-associated deaths in the USA in 2017 is a result of that preventive medicine and systems engineering effort.

Early research on addressing trauma and hemorrhage focused on replacement of fluids in animal models of controlled hemorrhage. Experiments showed that at cer-

tain volumes of blood lost, there were predictable complications of low blood pressure, poor oxygen delivery secondary to anemia, and loss of intravascular colloid osmotic pressure. These, in turn, could be treated with saline-based fluids, RBC transfusion, and albumin, leading to an early focus on replacing volume with crystalloid fluids and maintaining oxygen delivery with RBCs. ATLS guidelines accordingly instructed providers to give up to 2 L of crystalloid fluids to maintain blood pressures before transfusing packed RBCs. Other products were reserved until laboratory testing revealed deficits: plasma for patients with prolonged prothrombin times (PT) or activated partial thromboplastin times (aPTT), platelets for patients with a concentration less than 50,000/ μ L, and cryoprecipitate in cases where fibrinogen was less than 100 mg/dL.

This ATLS system had major positive effects for many moderately injured patients, but those with more severe injuries frequently received tens of liters of crystalloids and had numerous secondary iatrogenic complications. Massive tissue edema made surgical handling of tissues more difficult and led to a swollen bowel that would compress the inferior vena cava, resulting in an abdominal compartment syndrome and worsening hypovolemic shock. Attempting to prevent the most severe consequences of bowel swelling by leaving the abdomen open led to other secondary complications, including additional fluid and protein losses; prolonged respirator use, with pneumonias and shock lung; prolonged hospitalization; and organ failure mortality. Use of cold crystalloid fluids in resuscitation also caused both hemodilution and hypothermia, which resulted in worsening coagulopathy, more bleeding, and administration of additional crystalloids, a phenomenon referred to as the *bloody vicious cycle*. Acidosis, hypothermia, and coagulopathy became known as the *triad of death*.

Surgeons struggled with bleeding that progressively worsened during procedures as these factors took hold. “Damage control” surgeries, performed quickly in the hopes of avoiding the bloody vicious cycle, helped to minimize some of the insults that contributed to mortality in these critically ill patients. Despite these and other efforts to improve trauma care, in patients who met the arbitrary criteria for massive transfusion (10 units of packed RBCs given in a 24-hour period), the average mortality was 40%, increasing to 50% in those who needed 20 or more units. By the early 1990s, there was mounting evidence that contemporary guidelines for resuscitation using crystalloid fluids, even with “damage control” surgery, were failing to meet the needs of severely injured and actively hemorrhaging patients.

In the same period, Bickell and his colleagues described a therapeutic benefit of not resuscitating some patients with penetrating truncal trauma (Bickell et al., 1994). Moderately hypotensive patients who underwent exploratory surgery before resuscitation had lower mortality than patients who were resuscitated first. A similar study by Dutton, Mackenzie, & Scalea (2002) showed no mortality benefit to early resuscitation in moderately hypotensive trauma patients undergoing rapid evaluation at a level 1 trauma center.

The Acute Coagulopathy of Trauma

Acute coagulopathy of trauma (ATC) entered the lexicon in 2003 and described a cause of bleeding that was independent of but often additive to acidosis, hypothermia, and dilution (Brohi, Singh, Heron, & Coats, 2003; MacLeod, Lynn, McKenney, Cohn, & Murtha, 2003). Laboratory evidence of coagulopathy was present in a quarter to a third of severely injured patients at admission and appeared to be the result of extensive microvascular injury, acute consumption of platelets and coagulation factors, and activation of anticoagulant mechanisms. ATC was independently predictive of total blood usage and strongly associated with hemorrhagic death. While debate persists regarding its types and manifestations, questions of classification have not slowed the accumulation of knowledge about its general mechanisms.

ATC occurs secondary to the vascular injuries associated with shock. The coagulation system responsible for addressing these injuries is finite and comparatively small. In a typical patient with 5 L of blood volume and a 40% hematocrit, the 3 L of plasma contains a total of 9 g of fibrinogen, the raw material for making clot. Plasma clotting factor VII, which initiates plasma coagulation, is present in nanomolar concentrations for a total of 1 mg to drive clot initiation over the entire circulatory system. It can swiftly be “used up” in large soft-tissue injuries (Cohen, Kutcher, & Redick, 2013). Platelets, 2 trillion in number in a normal adult, can cover only 20 square meters of the 3000 square meters of blood vessel wall. Significant blood loss from the circulatory system further depletes these limited quantities.

Distributed microvascular trauma due to high-energy blunt or penetrating injury results in innumerable small sites of endothelial injury. As blood circulates to these sites, cycles of clotting activation can result in depletion of platelets and coagulation factors and loss of platelet activity in the platelets that continue to circulate. This *platelet fatigue*, where patients with normal or low-normal platelet counts have reduced platelet activity, is similar to the platelet functional loss seen in patients on heart-lung machines. There is also an endotheliopathy of trauma, which is partially avoided or improved when plasma as opposed to crystalloid fluids are given (Pati et al., 2016).

While hemorrhagic shock and hypotension may reduce immediate blood loss from penetrating injuries, reduced tissue perfusion results in increased anaerobic metabolism, leading to acidosis. Coagulation factors combine into active complexes by utilizing charge interactions with phospholipids on the surfaces of platelets and endothelial cells in clot formation. This process results in highly specific, localized increases in clotting function activity; acidosis, however, which occurs with an increase in positively charged protons, disrupts these interactions and lowers clotting activities. At a pH of 7.2, the reduction is 50%; at 7.0, 70%; and at 6.8, 80%. These pH values are well within the range seen on blood gases drawn on severely injured patients during resuscitation.

As warm blood leaves the body to be replaced by cool fluids, and patients are exposed to cool environments and evaporative cooling, core temperatures drop,

leading to systemic hypothermia. For every degree Celsius decrease, there is a corresponding 10% reduction in coagulation enzyme activity. This process has an even more dramatic effect on platelets, which require temperature-dependent interactions with von Willebrand factor that decrease exponentially to the point of near absence at 30 °C. One obvious solution that is now widely utilized in resuscitation has been the adoption of blood warmers to allow for transfusion of warm blood into hypothermic patients, in conjunction with other passive and active forms of warming and a reduction in the use of cold crystalloid fluids.

Inappropriate fibrinolysis in trauma can contribute to coagulopathy by causing excessive breakdown of fibrin clots. This is appropriate to maintain microvascular patency in normal states, but during trauma this system can be mobilized, resulting in clot breakdown and bleeding. Plasmin, activated by tissue plasminogen activator released in response to low blood flow, and neutrophil elastase, released from injured tissue, are linked to this pathologic fibrinolysis. Protein C also contributes through inactivation of plasminogen activator inhibitor.

Patient-to-patient variability exists in the extent of fibrinolysis after severe trauma, with some patients having massive fibrinolysis and others exhibiting the opposite phenomenon, *fibrinolysis shutdown*, or impaired clot breakdown. In a study by Moore and colleagues of 2540 injured patients with an injury severity score (ISS) greater than 15, 46% of the admitted patients had a fibrinolysis shutdown phenotype, and 18% had hyperfibrinolysis, as measured by viscoelastic testing (Moore et al., 2016). While hyperfibrinolysis physiology was associated with the highest risk of mortality (OR 3.3), fibrinolysis shutdown was also independently associated with a lesser but still increased risk of mortality (OR 1.6). More patients die early of excessive fibrinolysis, but more patients have inhibited fibrinolysis and are at increased risk for related complications.

Multiple physiologic abnormalities limiting clotting effectiveness can occur simultaneously because trauma patients routinely experience exposure, which leads to hypothermia; poor tissue perfusion, which leads to acidosis; and unbalanced resuscitation. Cosgriff et al. (1997) described these risks as additive, identifying that severely injured patients without additional abnormalities were coagulopathic 10% of the time, but that this rate increased to 40% with dilution, 50% with hypothermia, and 60% with acidosis. If three or more of these factors were present, however, 85–98% of patients were coagulopathic. Inflammation also plays an important and understated role in ATC, as evidenced by Neal and colleague's analysis of Glue Grant data, which presented 47 patients who had taken a nonsteroidal anti-inflammatory drug (NSAID) prior to trauma and had a 72% reduction in risk for coagulopathy and significantly decreased odds of needing more than 2 units of FFP or 1 unit of platelets in the first 6 hours (Neal et al., 2014).

The impact of coagulopathy on outcomes can be stratified on the basis of severity of the laboratory abnormalities. PT are generally more sensitive to the early consumptive effects of trauma, consistent with early depletion of factor VII. Prolongation of aPTT in trauma represents later and more severe changes as consumption overtakes the larger starting amounts of other clotting factors. Accordingly, a study by

MacLeod and colleagues of 20,103 patients showed that 28% of seriously injured patients had a prolonged PT, with an associated excess inhospital mortality of 35%. By contrast, only 8% of severely injured patients had a prolonged aPTT, but these patients had excess inhospital mortality of 426% (MacLeod et al., 2003). Cohen and colleagues studied the plasma of patients from the Prospective, Observational, Multicenter, Major Trauma Transfusion (PROMMTT) study and found that 42% had an international normalized ratio (INR) greater than or equal to 1.3 and most of these had decreased concentrations of factors I, II, V, and VIII along with increased concentrations of activated protein C (Cohen et al., 2013).

Modern Hemostatic Resuscitation

US military surgeons, relatively inactive in the 15-year period between the end of the Vietnam war and the First Iraq War, experienced the limitations of crystalloid and sequential blood component-driven resuscitation in subsequent conflicts in Somalia, Bosnia, Kosovo, Afghanistan, and the Second Iraq War. Battlefield conditions usually precluded the administration of platelets, and field experiences showed that administration of crystalloid fluids and RBCs alone quickly resulted in uncontrolled coagulopathic bleeding in severely injured soldiers. “Walking blood banks” of uninjured soldiers prepared to donate whole blood were developed in deployed hospitals, and many surgeons observed that whole blood was dramatically effective at stopping coagulopathic bleeding (Chandler, Roberts, Sawyer, & Myers, 2012).

In the Second Iraq War, increasing numbers of casualties over several years led to the field deployment of more thawed FFP in combat support hospitals and suggestions for its early use in a 1:1 unit ratio with RBCs (Armand & Hess, 2003). Its use early in casualty care appeared to lead to marked improvements in outcome. The earliest hospital-wide adoption of this “damage control” resuscitation policy occurred in the US Army Combat Support Hospital in Baghdad in the summer of 2004 (Borgman et al., 2007). The results were a stark difference from prior outcomes, with a 55% reduction in absolute mortality with higher ratios of administered units of plasma to RBCs. On the basis of this early experience, the US military provided theater recommendations for early balanced hemostatic resuscitation in late 2004 and nationally advocated that a 1:1:1 ratio of RBCs, plasma, and platelets be given to severely injured patients in 2007 (Holcomb et al., 2007). Holcomb and his colleagues have subsequently conducted a major review and several large, multicenter, prospective trials of resuscitation in trauma, including the Trauma Outcomes Group study (Holcomb et al., 2011), the PROMMTT study (Holcomb et al., 2013), and the Pragmatic Randomized Optimal Plasma and Platelet Ratios (PROPPR) trial (Holcomb et al., 2015). Together, these studies found that early and balanced ratios of blood products reduce mortality from hemorrhage, provide better outcomes, and generally address the unique physiology of trauma-associated bleeding. Recently, Shackelford et al. (2017) showed that prehospital blood products, transfused within 15 minutes of injury, were associated with improved outcomes.

Blood donor centers and transfusion services have become partners in this care. They have developed new blood products, such as group A low-titer anti-B liquid plasma, to supplement the limited supply of AB plasma, and they have revived old products, such as whole blood. They have become skilled at delivering these products to sites of care in record volumes and short times (Novak et al., 2015). They have expanded the indications for “damage control” resuscitation to cardiac surgery, liver transplant, gastrointestinal bleeding, and obstetric bleeding, leading to better outcomes and reduced overall blood use (Holcomb & Pati, 2013).

Balanced hemostatic resuscitation for trauma is now the standard of care, as advised by the guidelines of the Eastern Association for the Surgery of Trauma (EAST) and written into the massive transfusion protocols of more than 90% of level 1 trauma centers (Cannon et al., 2017). Mortality among severely and profoundly injured trauma patients arriving at the trauma center alive and without critical neurologic injury is at all-time lows and is being reduced even further with prehospital hemorrhage control and field blood administration.

Clinical Pearls

- Bleeding is the most common and most preventable cause of early trauma death.
- A massive transfusion protocol can guide resuscitation in the busy environment of acute trauma care.
- Rapid laboratory feedback on the presence and nature of coagulopathy and the quality of hemostatic resuscitation is important for recognizing unusual complications early.
- Prehospital hemorrhage control and balanced blood administration can save lives.

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Chapter 17

Diagnosis and Management of Penetrating Thoracic Vascular Injury



Matthew J. Bradley and Thomas M. Scalea

Background/Epidemiology

Overall, thoracic injuries are common. They occur in approximately 60% of civilian trauma patients and account for nearly 25% of traumatic deaths (Broderick, 2013; Manlulu, Lee, Thung, Wong, & Yim, 2004; Mowery et al., 2011). Historically, thoracic trauma has been highly lethal, especially among military combat casualties. During World War I, penetrating thoracic injuries had an associated mortality over 70% (Mahoney, Ryan, Brooks, & Schwab, 2005). While mortality from all thoracic wounds dropped significantly in the Vietnam conflict (by 3%), mortality specifically from thoracic gunshot wounds remained high at 80% (Mahoney et al., 2005). In the recent US military involvement in Afghanistan, thoracic injuries were responsible for 30% of combat deaths (Hodgetts et al., 2007).

Overall, while thoracic trauma is common, penetrating vascular injuries account for only a small percentage of the total injuries, representing approximately 14% of all vascular injuries (Mattox et al., 1989). Although rare, these vascular wounds are associated with high morbidity and mortality (Demetriades, 1997; Demetriades & Asensio, 2001). Their infrequent occurrence and the associated lack of clinical experience with managing them, coupled with the varied, difficult anatomy and operative exposure considerations, make these wounds challenging, even to the most senior surgeons.

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Given the high morbidity and mortality associated with thoracic trauma, it is paramount that surgeons understand how to approach these injuries, especially in regard to the complexities of vascular injuries. This chapter discusses the diagnosis, management, and complications of penetrating thoracic trauma, with a particular emphasis on vascular injuries.

Presentation, Examination, and Diagnosis

Presentation and Physical Examination

In patients presenting with penetrating thoracic wounds and hypotension, surgeons should suspect a great vessel injury and consider the possibility of cardiac tamponade, tension pneumothorax, and massive hemothorax from pulmonary parenchymal injuries. Depending on the severity of injury (pseudoaneurysm or an arteriovenous fistula), however, patients with penetrating thoracic vascular injuries may be hemodynamically normal on arrival to the trauma bay.

Initial evaluation should follow standard Advanced Trauma Life Support protocols. On exam, patients may have decreased or absent breath sounds; muffled heart tones, suggesting pericardial tamponade; an expanding hematoma; or active external hemorrhage. It is important to perform a neurovascular examination. Decreased, absent, or unequal peripheral pulses suggest a vascular injury. Neurological deficits suggest associated nerve injury, a relatively common finding with penetrating subclavian trauma.

A Focused Assessment with Sonography in Trauma (FAST) exam is especially helpful when the trajectory of the penetrating wound is uncertain and the patient is unstable because it can determine the presence or absence of hemopericardium and hemoperitoneum. Performing the extended version of the assessment (eFAST) through views along the rib cage can also yield information on the presence of a pneumothorax or hemothorax. A bedside chest radiograph (CXR) is also useful during the initial workup. Findings on a CXR that raise concerns about a vascular injury include a widened mediastinum, an apical cap, a large hemothorax, or the presence of a metallic fragment in the vicinity of the great vessels. CXR can also provide information on the trajectory of a wound and detect concomitant injuries, such as a pneumothorax and rib fractures.

After a rapid assessment, the unstable patient should be taken immediately to the operating room. Direct digital pressure should be applied to active external hemorrhage. Alternatively, a Fogarty or Foley catheter, depending on availability, can be inserted into the wound track for temporary hemostasis while the patient is transported to the operating room. The catheter is inserted, the balloon is then inflated, and the catheter is withdrawn until the bleeding stops. It is important that a team member maintains control of the inflated balloon to prevent dislodgement, thereby losing hemostasis. The catheter can be prepped into the operative field to preserve hemostatic control while surgical exploration is undertaken.

In the hemodynamically stable patient, additional diagnostic imaging should be pursued to help guide further management and selection of the optimal incision. Traditionally, angiography was the gold standard diagnostic test for the assessment of great vessel injuries. However, with the major technical advances, computed tomography angiography (CTA) has largely replaced catheter-based formal angiography. CTA is a highly accurate and reliable modality to diagnose great vessel injury (O'Connor & Scalea, 2010). In addition, it can recognize extravascular injuries that are not readily identified on CXR or angiography. For many vascular injuries, catheter-directed therapy, either stenting or embolization, also offers the option of immediate endovascular repair.

Management

Resuscitation and Anesthetic Considerations

In the hemodynamically compromised patient, resuscitation should follow the principles of damage control resuscitation (DCR), which include minimizing crystalloid infusion, ratio-driven blood product administration, and permissive hypotension (Hess, Holcomb, & Hoyt, 2006). DCR is relatively new and strives to prevent or mitigate the lethal coagulopathy of trauma and reverse shock.

Communication with the anesthesia team is vital. For hemodynamically normal patients, the surgical and anesthetic teams may have the time to discuss lung isolation strategies, such as the placement of a double-lumen endotracheal tube (ETT), if such a strategy is necessary to optimize surgical exposure. The surgical team needs to be mindful of the time it takes to place a double-lumen tube, which can be quite difficult to position and can become mal-positioned (Campos, Hallam, Van Natta, & Kernstine, 2006). In emergent situations, when timely intubation is essential, the airway is secured through the placement of a single-lumen tube. Afterward, should the surgical team need lung isolation, a single-lumen tube can be advanced past the carina. Blindly advancing the ETT usually places the tube in the right bronchus because of the anatomic vertical, straight-line takeoff of the right bronchus from the carina as compared with the left main bronchus. A bronchoscopically placed balloon catheter can also achieve lung isolation. Alternatively, temporary or intermittent lung isolation can be achieved by hypoventilating the patient or briefly halting ventilation.

Optimal resuscitation of the patient is unquestionably dependent on a two-way discussion across the surgical drapes. During anesthetic induction, it is useful to know which medications are being delivered. In the hypotensive patient, ketamine may be used because it has minimal effects on blood pressure and cardiac output (Morris, Perris, Klein, & Mahoney, 2009). Regardless of which medications are used, hypotension should be anticipated after induction of anesthesia. During the operation, resuscitation for massive hemorrhage should follow the principles of DCR discussed above. Persistent or new episodes of hypotension that cannot be

explained by ongoing bleeding should alert the teams to other causes of hypotension, such as surgical manipulation of the lungs or mediastinal structures. Likewise, hypoxemia, elevated airway pressures, and arrhythmias should stimulate a discussion among the anesthetic and surgical teams. In that regard, it is helpful to update the anesthesia team on surgical progress and maneuvers that may alter the physiologic parameters they are monitoring. By maintaining open lines of communication, overuse of blood products can be minimized, and troubleshooting of intraoperative dilemmas can be addressed in a quick and efficient manner.

Operative Approaches

There are many different incisions for thoracic exposure, some more favorable than others, especially when the patient's hemodynamic status is considered. The ideal incision should be one that is versatile, provides maximal exposure for the anticipated internal injury, and is familiar to the surgeon.

The decision about the optimal incision is made according to the location of the injury and patient stability. There are times when a vascular injury, such as a pseudoaneurysm or arteriovenous fistula, has been diagnosed on preoperative imaging. In that case, the incision can be limited and tailored only to expose the diagnosed injured structure. Often, the specific diagnosis is made at the time of exploration. In patients with no preoperative diagnosis, the incision is based on the surgeon's best guess as to what thoracic zone or specific injury exists, and the incision should be versatile, i.e., the surgeon must be able to extend the incision or make a second incision to achieve exposure.

As in virtually every trauma patient, the surgical prep should be very wide, from the angle of the mandible to the knees. It is frustrating when the senior surgeon is called in to help and the patient has been prepped inadequately. All equipment must be immediately available as well. For instance, if an anterolateral thoracotomy is the planned procedure, the sternal saw should be immediately available in case a second incision is necessary. Similarly, a Gigli saw should be available because it is the ideal instrument to divide the clavicle, should that be necessary. In all cases, the defibrillator and internal paddles should be open and on the field. Ventricular fibrillation can occur even if the heart is just touched, particularly if the patient is in shock.

Emergency Department Thoracotomy (EDT)

Based on the Western Trauma Association guidelines, the general indications for an EDT or resuscitative thoracotomy for penetrating trauma are loss of vital signs in the trauma bay or less than 15 minutes of cardiopulmonary resuscitation (CPR) prior to arrival. In case of penetrating trauma specifically to the neck and extremities, however, CPR time is reduced to less than 5 minutes. The guidelines consider an EDT outside of these time frames as futile because patients cannot be saved. It

should be noted, however, that these are only guidelines. There is no substitute for good clinical judgement, and treatment should be individualized.

The incision for an EDT is made at the 4th to 5th intercostal space, which corresponds to the inframammary crease, just below the pectoralis muscle. A key step to performing this incision is to carry it along the curve of the rib posteriorly and “down to the gurney.” Many make the incision straight, which brings it down to the xiphoid; this error makes entering the thorax difficult. It is ideal to come across the sternum in the right chest with a Lebsche knife for optimal exposure; this is also difficult without the proper incision. Alternatively, trauma shears or heavy scissors can be used to divide the sternum, if necessary. Scissors can also be used to quickly divide the intercostal muscles along the top of the 5th rib.

When inserting the Finochietto rib retractor, the handle should be placed posteriorly in the axilla to prevent the cross bar from interfering with the exposure. In doing these maneuvers, EDT incision will provide access to the mediastinum, great vessels, and the left thorax. From this incision, however, it may be difficult to reach posterior thoracic structures. If one needs to gain access to the right thorax, the incision can extend across the sternum into a “clamshell” bilateral anterolateral thoracotomy.

When coming across the sternum and into the right thorax, an inferior incision, if placed too low, limits visualization of the superior mediastinum. Bleeding from the pulmonary hilum can be managed by placing a clamp across it or performing a hilar twist. The surgeon needs to divide the inferior pulmonary ligament beforehand. At the end of the case, the surgeon also needs to ensure that the internal mammary arteries are hemostatic. Otherwise, the patient may require additional surgery.

Anterolateral Thoracotomy

While an EDT is essentially a left anterolateral thoracotomy, there are minor but important differences when performing an anterolateral thoracotomy in the operating room under more stable or elective conditions. Depending on the indication, the incision can be placed lower (6th to 7th interspace) and does not need to come across the sternum. We routinely place a bump under the patient’s back to improve exposure and access to the posterior thorax. This also avoids placing the patient in the decubitus position and is especially helpful in emergent settings when a concurrent exploratory laparotomy is required.

Sternotomy

A sternotomy provides excellent exposure of the heart and proximal great vessels but limited exposure of posterior mediastinal structures. In stable patients, in both elective and emergent situations, a partial sternotomy with extension into the neck or along the clavicles exposes the distal carotid or subclavian vessels respectively. Sternotomy, either partial or full, with supraclavicular extension is the preferred method in our institution for addressing the left or right carotids and subclavian vessels. The method selected depends on patient stability.

Typically, the sternum can be divided equally quickly with an oscillating saw or Lebsche knife. It is easier to divide the sternum from the caudal to the cranial end, especially when using the Lebsche knife. The head and endotracheal tube may obstruct the surgeon from generating enough force to split the sternum if one approaches from the cranial aspect. Removing the xiphoid process can help center the instrument onto the sternum.

Posterolateral Thoracotomy

The posterolateral approach requires the patient to be positioned in the decubitus position. This is one reason why it is not an ideal incision in an emergency case and should be reserved for elective or well-identified, isolated posterior thoracic injuries. A posterolateral thoracotomy is also cumbersome, and it is time-consuming to reposition a patient to a supine orientation in the instance when an emergent exploratory laparotomy is needed in the polytrauma patient. The operative team also must be mindful of the potential effect that positioning has on the patient's hemodynamics, especially in the right lateral decubitus position.

Trap Door

A combined anterolateral thoracotomy, sternotomy, and periclavicular incision, otherwise known as the "trap door," has fallen out of favor, and we virtually never use it. In the past, it was used for exposure of the left subclavian vessels. However, this technique takes a significant amount of time to complete, especially if combined with a clavicular head resection, and it is difficult to maintain retraction of the "door," which often results in unnecessary posterior rib fractures.

A modification of this incision is to omit the sternotomy. This approach has been favored for exposure specifically of the left subclavian artery because of the relative posterior location of this artery on the aortic arch. Proximal control of the left subclavian artery is obtained via a left anterolateral thoracotomy through the third interspace. Then, a separate periclavicular incision can be made for distal control of the subclavian artery. In our experience, a sternotomy with supraclavicular extension exposes both the left and right subclavian vessels. This approach is quicker, provides excellent exposure, and avoids making two separate incisions.

Specific Vascular Injuries

There are several options for addressing vascular injuries, including ligation, primary repair, patch angioplasty, interposition grafting, and temporary shunting (see Damage Control Thoracic Surgery). Debridement of nonviable or damaged vessels should occur prior to attempting repair. The choice of procedure should be dictated

by anatomic considerations, the severity of vessel injury, and the patient's physiological status. In general, ligation of arteries, such as the subclavian, should only be considered in moribund situations when saving life over limb. Both angioplasty and grafting can be performed with a prosthetic or autologous vein. In grossly contaminated fields, autologous vein is the patch or conduit of choice. Side-biting vascular clamps and intestinal Allis clamps are helpful instruments for obtaining hemostasis while maintaining distal perfusion. Inflow and good back-bleeding are mandatory prior to completion of a repair. If inflow or outflow is in question, a proximal and distal thrombectomy should be performed. At the end of the case, a completion angiogram or distal pulse need to be present to confirm the patency of the repair (O'Connor, 2015).

Details of surgeries on five kinds of blood vessels are provided below.

Thoracic Aorta

Overall mortality for penetrating thoracic aortic injuries has been reported to be over 80% (Cornwell, Kennedy, Berne, Asensio, & Demetriades, 1995). For those who survive to an operation, a lateral arteriorrhaphy or interposition graft with the "clamp and sew" or bypass techniques are the best options for repair. While challenging, efforts should be made to limit aortic cross-clamp time to under 30 minutes, which may help limit the risk of postoperative paraplegia (Fabian et al., 1997).

Pulmonary Artery

Proximal control of the pulmonary arteries can be obtained within the mediastinum. The right pulmonary artery can be found coursing under the arch of the aorta and anterior to the superior vena cava. The right-sided pulmonary artery can sometimes be most easily controlled in the pericardium. Proximal control can also be obtained by performing a hilar twist. While this will provide good inflow control, operating on the hilar vessels with the lung twisted is difficult. Alternatively, a vascular clamp can be placed across the hilum, proximal to the site of bleeding. Care must be taken to avoid damaging the bronchus. Thus, neither option is ideal. Regardless of the method used, patients in shock often develop acute right heart failure when the main pulmonary artery and veins are occluded. Management of significant pulmonary artery injuries often requires a pneumonectomy.

Innominate Artery

Exposure of the innominate artery can be improved with ligation of the innominate vein. While small injuries can be repaired primarily, destructive injuries may require bypass and exclusion. After obtaining proximal control at the origin of the innominate and distal control just proximal to the carotid and subclavian arteries, a graft is

sewn at an alternate site on the aortic arch. The innominate artery is divided, and then the distal end is sutured to the distal end of the graft to restore flow. Finally, the proximal innominate is oversewn (Wall, Hirshberg, LeMaire, Holcomb, & Mattox, 2001).

Carotid/Subclavian Arteries

It is important to avoid iatrogenic injury to the brachial plexus, which is intimately related to the subclavian vessels. On the left, the surgeon needs to be mindful of the recurrent laryngeal nerve and the thoracic duct. If the duct is injured, it can be ligated. Both the carotid and the subclavian vessels are relatively immobile, making it difficult to perform a primary end-to-end anastomosis without placing the repair on undue tension. Therefore, in scenarios with more destructive injuries, an interposition graft is a more viable option.

Venous Injuries

Most venous injuries in the chest can be ligated, with the exception of the superior and inferior vena cava. Intestinal Allis clamps can also be very helpful in controlling bleeding from venous injuries. If attempting venous repair, consideration should be given to the time necessary to complete this procedure and the chance of the repair thrombosing postoperatively. It is reasonable to repair small lacerations, if they can be done quickly. Otherwise, ligation should be favored, especially in the unstable patient. Proximal control of the pulmonary veins is achieved in the same fashion as for the pulmonary arteries, i.e., via the mediastinum.

The short course of the thoracic inferior vena cava makes this a challenging injury to address. Thus, repair of these injuries may be easier to approach through the right atrium. Venovenous bypass is a useful adjunct in this setting. Like other venous injuries, the azygous vein can be ligated. However, the surgeon needs to investigate for concomitant aerodigestive injuries, given the relationship of the azygous to the esophagus and right bronchus.

Endovascular Surgery

Endovascular approaches have emerged as effective options in the management of traumatic thoracic vascular injuries. While data are limited to single-institution experiences and case series, additional reports are being published with increased frequency (Branco et al., 2016; Desai et al., 2014; Glaser & Kalapatapu, 2019). Endovascular surgery avoids the morbidity of an incision and the potential for iatrogenic injury to surrounding structures and can be performed with minimal anes-

thetia. Without the benefit of pre-intervention imaging, however, endovascular therapy may be limited in the emergency scenario. The long-term durability of stents placed in these instances is unknown.

Damage Control Thoracic Surgery

Damage control surgery (DCS) is not a new concept but has been predominantly used to address intra-abdominal injuries in the hemodynamically compromised patient. The tenets of DCS, a term formally described by Rotondo and colleagues in the early 1990s for use in the abdomen, include rapid hemorrhage control, containment of gross contamination, resuscitation, and planned re-exploration (Rotondo et al., 1993). The overarching goals of DCS are to quickly address injuries, often temporarily, and to correct profound physiological derangements (acidosis, hypothermia, and coagulopathy). After the patient has become more physiologically “normal” and has recovered from the initial insult, definitive management of injuries can proceed. Because damage control resuscitation (DCR) is an extension of DCS, these two techniques should be used in conjunction to maximize the ability to physiologically stabilize the patient.

Options for hemostasis in the damage control setting include packing—alone or in combination with vessel ligation—and placement of a temporary intravascular shunt, which allows for restoral of distal blood flow. There are several commercially available Silastic shunts; the most commonly used are the Argyle and Pruitt-Inahara (Inaba et al., 2016). The advantage of the Pruitt-Inahara shunt is that it has a side port for infusion and pressure and flow monitoring. Alternatively, something as simple as IV tubing or as large as a chest tube can be used, provided it is appropriately size matched.

While DCS has been used mostly to describe the management of intra-abdominal catastrophes, these same principles have been successfully implemented in the treatment of thoracic trauma, i.e., rapid control of thoracic hemorrhage, packing and temporary chest wall closure, and returning to the operating room after adequate resuscitation. Our institution has demonstrated good success with thoracic damage control in patients with significant metabolic abnormalities, especially those with concomitant injuries also requiring emergent exploratory laparotomy (O’Connor, DuBose, & Scalea, 2014).

Complications

Specific complications to vascular repair include bleeding, thrombosis, upper extremity limb edema, and conduit infection, especially with the use of a prosthetic graft. Extremity edema is usually self-limited and managed with limb elevation.

Bleeding at the repair or anastomotic site presents as persistent or large bloody chest tube output, hemodynamic compromise, and/or a decrease in hemoglobin levels. This usually necessitates operative exploration and revision. Thrombosis presents as decreased or absent distal pulses and can be managed via an endovascular or open approach. Conduit infection is a life-threatening complication that mandates graft excision.

Other common postoperative complications associated with thoracic vascular trauma include pulmonary complications, such as concomitant pulmonary injuries, atelectasis, respiratory failure, and acute respiratory distress syndrome (ARDS). Crystalloids should be used judiciously to prevent further lung injury, and blood products should be transfused in a balanced transfusion ratio (Round, Mellor, & Owens, 2015). Lung-protective strategies, such as low tidal volumes and maintaining plateau pressures below 30 cm H₂O, should be implemented to reduce ventilator-associated lung injury (Acute Respiratory Distress Syndrome et al., 2000).

Associated nerve injuries, such as to the brachial plexus or phrenic nerve, may be due to stretch and can improve with conservative therapy. An electromyography is often obtained approximately 6 weeks after injury for diagnostic and prognostic purposes. Nerve injuries identified at the time of initial exploration can be repaired, if surgical expertise is available, or tagged for repair at a later date. However, destructive nerve injuries from gunshot wounds are usually irreparable. A devastating complication associated with descending thoracic aortic injuries is paraplegia.

Like all operative procedures, operative thoracic trauma always has a risk of surgical site infection (SSI). Because the chest wall is well vascularized, thoracotomy incisions have a relatively low risk for SSIs. However, any gross contamination of the penetrating wound will inherently place the patient at a higher risk for an SSI. Systemic antibiotics with local wound care, such as wet-to-dry dressing or Negative Pressure Wound Therapy (NPWT), depending on the depth of infection, are usually sufficient to manage thoracotomy SSIs. Sternal wound infections can be more problematic, especially if they are full thickness. A dehiscence of the incision should be considered an infection until proven otherwise. Surgical debridement combined with NPWT or a rotational muscle flap, such as a pectoralis flap, may be required to definitively close a sternal wound (Jones et al., 1997).

Empyema is an uncommon but very serious infectious complication. An empyema should be entertained in a patient with a persistent effusion and/or opacity on chest radiograph and clinical markers for infection such as fever, tachycardia, and leukocytosis. A CT scan may be helpful in delineating an empyema from other postoperative thoracic pathology, such as a retained hemothorax. Percutaneous aspiration of the fluid collection, with analysis of the aspirate for pH, leukocyte count, gram stain, and culture, can help confirm the diagnosis. Treatment involves appropriate antibiotic coverage and, depending on the complexity of the pleural collection, drainage through the use of a percutaneous catheter, video-assisted thoracoscopic surgery, or thoracotomy with decortication.

Conclusion

Thoracic vascular trauma can be challenging, even for the most experienced surgeons. Knowledge of anatomy and familiarity with the various thoracic incisions are crucial to obtaining optimal exposure. In general, arteries should be repaired, whereas venous injuries, with the exception of caval injuries, can be ligated. Adhering to the principles of damage control surgery (DCS) and damage control resuscitation (DCR) will assist the surgical team with providing the best possible outcome in the physiologically compromised patient. Intravascular shunts can be placed in the damage control setting to shorten operative times. Endovascular surgery may become a more common approach to address these injuries in the future as the skill, technology, and experience in using this technique grow. The most common extravascular, postoperative complications related to thoracic trauma are pulmonary in nature. Lung-protective strategies and judicious use of fluids should be utilized to minimize these complications.

Clinical Pearls

- A Fogarty or Foley catheter balloon insertion can provide temporary hemostasis of vascular wounds, especially in locations where digital pressure may be difficult (e.g., subclavian vessels behind the clavicle).
- Placing a bump under the patient's back when performing an anterolateral thoracotomy is a useful adjunct to improve exposure, especially to posterior structures.
- A sternotomy with extension into the neck or along the clavicle is the approach of choice to expose anterior mediastinal vessels.
- Intestinal Allis clamps are useful instruments to maintain hemostasis while preserving blood flow.
- Unstable patients should be managed according to the principles of damage control surgery (DCS) and damage control resuscitation (DCR). Temporary intervascular shunts can be used to obtain hemostasis and reestablish distal blood flow.

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Chapter 18

Healing Hurt People-Chicago: Supporting Trauma Recovery in Patients Injured by Violence



Bradley C. Stolbach and Carol Reese

[A] high level of violence in their communities makes young men feel physically, psychologically, and socially unsafe. Physically, young men who have been shot, stabbed or attacked fear that unless they arm themselves, someone else might attempt to harm them as they have been injured before. Psychologically, they are left with the hypervigilance and disruption that come from trauma. Socially, they have often been raised in communities where there is a shared idea that if you fail to defend yourself when challenged, you become a “sucker,” which will lead other people, who now believe you are weak, to take advantage of you Sadly, because of their social position and the legacy of violence, racism, and poverty into which they have been born, they have become, for many of us, strange icons of fear. Each time a shooting or a stabbing or an assault is reported in the news, the details obscure a young man with a story, a young man with real blood running through his veins. John Rich, MD (Director of Drexel University’s Center for Nonviolence and Social Justice and Co-founder of Healing Hurt People; Rich (2009), pp. xiv–xv).

Despite the fact that many survivors of serious violent injury experience levels of post-traumatic stress disorder (PTSD) consistent with those of traumatized combat veterans, they rarely have access to psychological support or intervention. In addition to discrete injuries, survivors from communities with high levels of violence also contend with chronic adversity, developmental trauma, and continuous traumatic stress, all of which heighten risk for violent reinjury. Given that many violently injured patients have PTSD and other “invisible” injuries that increase risk for injury recidivism, trauma centers have not only an opportunity but also an ethical obligation to provide support and intervention for the psychological injuries that accompany patients’ physical injuries.

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How Do We Know that Our Patients Have Psychological Injuries?

Common sense Anyone who has ever lived through a life-threatening situation, serious injury, or assault knows that those experiences stay with them, preoccupy them, perhaps even take over their life for a period of time. It is simply common sense that experiences such as getting shot cause significant distress and make day-to-day life difficult.

Trauma theory When faced with a severe threat, the human brain and body go into “survival mode.” During this trauma response, subcortical regions of the brain predominate; attention narrows to focus solely on threat-related information; neurotransmitters and stress hormones prepare the body for fight or flight; and brain regions used to integrate and make sense of experience shut down. As a result, traumatic experiences are not integrated with other types of experience, memories, and aspects of self. Without integration, trauma-related memories and associations remain mostly out of consciousness, but they exert influence over perceptions and behavior. Traumatized individuals then alternate between functioning as if the traumatic situation is still occurring and functioning as if it never happened (van der Hart, Nijenhuis, Steele, & Brown, 2004). The symptoms of PTSD reflect this back and forth between reliving trauma (e.g., flashbacks, intrusive thoughts, strong affective reactions, hypervigilance) and detachment from it (e.g., numbing, avoidance, emotional unresponsiveness).

Research Healing Hurt People-Chicago (HHP-C) co-director Carol Reese and colleagues (Reese et al., 2012) found that 42% of trauma unit patients or their family members screened positive for PTSD. Patients with gunshot wounds (GSWs) were 13 times more likely to screen positive than those with falls and twice as likely as those in car accidents. Corbin et al. (2013) reported that 75% of HHP-Philadelphia (HHP-P) adult patients met criteria for PTSD and 66% of pediatric HHP-P patients had positive PTSD screens (Purtle, Harris, Compton, et al., 2014). HHP-C patients under age 19 have similar rates of PTSD (64.5%).

Our patients tell us As the above data suggest, HHP patients frequently experience the hallmark symptoms of PTSD. One HHP-C patient who was shot at age 16 described his reactions for the Al Jazeera America Fault Lines episode *Survival Mode*: “I watch everything, every little thing – somebody walking behind me ..., I’ll stop and let them walk ahead of me so I just wouldn’t be afraid as much ... Being through something like this can really affect your mind. You think so many things that a person my age shouldn’t be thinking about. It’s real scary ... Jumping up in the middle of the night, cold sweats, yelling, screaming. Just hearing the sound of the gun, of you being shot over and over ... It’s really scary ... After you wake up from it, your ears is ringing ... One day I went up there, just to see how it

feel and I actually stepped in the spot where I was shot, and I was just like, ‘No I ain’t coming back here no more.’ I had cold chills, I’m shaking. It just made me think about that night, so I’m not gonna go.”

On the basis of common sense, theory, research, and patient testimony, we know that many violently injured patients have both physical and psychological injuries. When a patient comes to the trauma unit with GSWs to the chest and ankle, we do not attend only to the bullet in the lung because the bullet in the ankle will not kill them right away. We treat both injuries. In terms of injury recidivism and mortality, our patients’ psychological injuries are likely much more important than a bullet in the ankle; yet, in most settings, we do not even check to see whether these injuries are there. Because of normal and expected numbing, dissociation, and avoidance during and immediately after serious threat, patients are unlikely to describe or even be aware of their “invisible” injuries. If the responsibility for identifying psychological injury and seeking intervention is placed on our patients, traumatization will rarely be diagnosed and treated.

Beyond PTSD: Multiple Traumas and Complex Developmental Trauma in Violently Injured Patients

Experiencing a violent injury can certainly cause PTSD; for many patients, however, the injury that brought them to the trauma unit is not the only, nor the most significant, traumatic event they have experienced. Data from 122 HHP-C patients, 87% of whom had been shot, revealed that 96% had experienced at least one prior traumatic stressor and 57% of this subgroup had been violently injured before. Nearly all (87%) had lost at least one family member or at least one close friend to homicide; 68% had witnessed one or more shootings or stabbings; 41% had witnessed domestic violence; and 37% had witnessed one or more homicides. In addition to multiple trauma types, survivors from disinvested communities contend with other forms of chronic adversity, developmental trauma, and continuous traumatic stress.

In recent decades, the study of trauma and adversity has shifted from a focus on the repercussions of single events to a focus on cumulative trauma and the developmental context in which traumatic episodes occur. Studies have established that, for a majority of trauma-exposed individuals, traumatic stress does not occur in isolation, but rather is characterized by co-occurring, often chronic types of victimization and other adversities. In the groundbreaking Adverse Childhood Experiences Study, Felitti et al. (1998) found a strong, graded relationship between household adverse childhood experiences (ACEs) (abuse; neglect; domestic violence; loss/separation; household members with addictions, mental illness, suicidality, or incarceration histories) and numerous behavioral and physical health problems in adulthood. In this predominantly white, college-educated sample, 9.5% reported three

ACEs and 12.5% reported four or more. In contrast, Corbin et al. (2013) reported that 56.3% of adult HHP-P patients had experienced three or more ACEs, 34.5% five or more, and 18.8% seven or more. Data from HHP-C patients under 19 also revealed high levels of ACEs, with 86.8% reporting three or more; 63.2%, four or more; 47.4%, five or more, and 18%, seven or more.

Exposure to multiple types of trauma and ongoing threat in the context of systems that cannot provide protection and comfort does not lead only to PTSD. Complex trauma shapes personality and limits acquisition of important developmental capacities, including the ability to modulate, tolerate, or recover from extreme affect states; the ability to know and describe what is happening inside oneself; the capacity to perceive threat; the ability to initiate and sustain goal-directed behavior; and the capacity to regulate empathic arousal (see Developmental Trauma Disorder [DTD], van der Kolk, Pynoos, Cicchetti, et al., 2009; Stolbach et al., 2013). When one understands the cumulative effects of violence, the burden of loss our children bear, and the adaptations necessary to survive in chronically dangerous environments, it becomes easy to see how developmental trauma or DTD can place young people in racially and economically segregated communities at high risk for involvement in violence and affiliation with armed groups.

Bocanegra and Stolbach (2012) found that “gang-involved” youth aged 13–17 reported exposure to an average of 12.75 different types of traumatic stress and ACEs. The youth all reported exposure to at least one chronic traumatic stressor and at least one form of family violence, with the first-reported trauma exposure at an average age of six. Youth had typically performed their first action on behalf of a street organization before age 12. Thirteen-year-old “Alfonso,” who had witnessed three homicides, reported that he first held a gun for his older brother at age eight. UNICEF defines a child soldier as any person below 18 years of age who is part of an armed force or armed group in any capacity. By this definition, not only “Alfonso” but a substantial proportion of injured patients have been working as child soldiers for months or years before they end up in a trauma bay. HHP-C participants who acknowledge a history of street organization involvement report a mean age of first affiliation of 10 years and 11 months.

Individual and Community Violence in Historical and Social Context

Despite the above facts, young people involved in community violence are rarely viewed as children or adolescents or as victims of labor trafficking. In an age of disproportionate mass incarceration of black and brown people, our violently injured patients are more typically viewed as criminals with adult responsibility for their behavior. Just as we need to understand our patients’ trauma histories and developmental contexts to understand their current behavior, to treat violence at the individual and community levels, we must view it in the context of societal trauma and structural violence.

According to Farmer, Nizeye, Stulac, and Keshavjee (2006), “Structural violence is one way of describing social arrangements that put individuals and populations in harm’s way ... The arrangements are structural because they are embedded in the political and economic organization of our social world; they are violent because they cause injury to people.” Farmer (2001) points out that structural violence is driven not solely by individual attitudes or culture but by historic and economic forces and that “[s]tructural violence is visited upon all those whose social status denies them access to the fruits of scientific and social progress.” By this definition, institutions that fail to provide care for some injury or illness because of economic constraints are not simply operating in the context of structural violence; rather, they may be understood as agents of that violence. The lecture series from which this chapter derives took place as University of Chicago Medicine prepared to open an adult level 1 trauma center on Chicago’s South Side after 27 years during which no such care was available, requiring trauma patients to travel to Chicago’s Near West Side, downtown, or suburban Oak Lawn.

The absence of trauma care on the South Side is one example of structural violence in a city with many. Chicago has long been one of America’s most racially and economically segregated cities, largely because of its history of restrictive covenants, redlining, and contract selling. The Chicago Public Schools (CPS) operated under a federal desegregation consent decree for 29 years until the decree was vacated, in part because only 8% of CPS students were white. In perhaps the city’s most shameful example of both structural and personal violence, an organized torture ring operated within the Chicago Police Department for two decades, with approximately 135 victims, all black. Although the torture has been well documented and acknowledged by the city, neither the commander nor any perpetrators responsible have ever faced prosecution. Understanding the systemic context in which individual violence occurs requires that we also understand our own potential to serve as agents of structural violence or to counteract its effects.

Violent Injury as a Recurring Medical Condition

Incidents of community violence do not occur in isolation; they are borne out of a vicious cycle that includes untreated trauma, adaptations to ongoing adversity and threat, the chronic stress of racial discrimination and disparities, poverty, and poor educational opportunities, all in the context of racial and economic segregation. Medical providers working in trauma centers have long been aware that violent injury can be viewed as a recurring “disease”; this insight is based on their experience treating patients with penetrating injuries, only to see those patients return in a period of months with new, sometimes fatal injuries. Injury recidivism rates reported in the literature vary, with 5-year reinjury rates up to 45% and mortality rates up to 20%. Cunningham et al. (2015) found that over one-third of assault-injured youth treated in an urban level 1 trauma center returned with violent injury within 24 months. The probability of reinjury was greatest among youth with PTSD and substance use disorder.

Various hospital-based violence intervention programs (HVIPs) have been implemented in efforts to reduce injury recidivism. Although research to date does not allow for meta-analysis, there is evidence that HVIPs decrease both recidivism and costs to hospital systems and society. Cooper, Eslinger, and Stolley (2006) conducted a randomized, prospective study in an urban level 1 trauma center and reported an HVIP patient recidivism rate of 5% compared with 36% for controls. Control patients also had more violent crime arrests and convictions. The HHP-P team at Drexel's CNVSJ conducted a cost-benefit analysis simulation for a hypothetical HVIP serving 90 patients. Using a per-patient cost of \$3889 and a base effect of 25%, Purtle, Rich, Bloom, Rich, and Corbin (2015) estimated total savings ranging from \$82,765 (reinjury healthcare costs only) to \$4,055,873 (including healthcare costs and societal costs related to perpetration and lost productivity).

The Case for Hospital-Based Violence Intervention

If we know that (1) patients with violent physical injuries also have psychological injuries that increase reinjury risk; (2) violent injuries often occur in the context of complex developmental trauma that further heightens recidivism risk; (3) many violently injured trauma patients have been recruited at a young age into activities that place them at risk; (4) violent injuries disproportionately affect black and brown people from disinvested communities most affected by structural violence; (5) urban trauma centers have the opportunity to combat structural violence or to be agents of it; (6) interventions exist that can relieve patient suffering, interrupt the violent injury “disease process,” and save hospitals and society money; and (7) these interventions cost little more than current standards of care, then what could possibly be the justification for withholding HVIPs from our patients? For too long, in some settings, the attitude of providers and systems toward our young patients has been that they do not deserve care because they “got themselves” shot or assaulted or that “it is too late,” so intervention is a waste of time and money. Even when such attitudes do not prevail, systems resist change, and care and budgets are structured the way they always have been because that is how it has always been done. When it comes to violent injury, it is time to stop denying our patients “access to the fruits of scientific and social progress” and to do what we can as providers to help our patients stay out of “harm’s way.”

The Healing Hurt People Model

In his book *Wrong Place, Wrong Time*, HHP co-founder John Rich chronicles the stories of young black men who had repeatedly sustained violent injuries (Rich, 2009). What emerges from his analysis of these stories is an understanding that untreated, unresolved psychological trauma drives much of the risk for violent

injury. Behaviors such as using substances or carrying a gun for protection are understood as rational attempts to manage trauma-related emotions and physical reactions. Many violently injured patients are caught in a vicious cycle (Fig. 18.1) in which violence leads to symptoms of acute stress disorder/PTSD/DTD, which then increase risk behaviors. Once injured, patients may struggle with a decreased sense of safety, physical challenges from their injuries, and a desire for retaliation. HHP is a trauma-informed HVIP developed and refined over the last decade by John Rich, Ted Corbin, MD, and Sandra Bloom, MD, pioneers in the fields of public health, emergency medicine, and trauma psychiatry, who co-direct Drexel's CNVSJ. The primary goal of HHP is promoting trauma recovery to decrease risk for reinjury, retaliation, and justice system involvement (Corbin et al., 2011).

The HHP model is based on the premise that routine care of violently injured patients must include attention to psychological injury and that providing intervention for trauma reactions can reduce patient suffering and decrease risk for reinjury. Level 1 trauma centers are ideal locations to intervene because patients are often open to accepting support in the immediate aftermath of a traumatic injury, which many describe as a “wake-up call.” Because HHP focuses on trauma recovery, program services are delivered by advance-degreed clinical professionals, typically social workers.

HHP begins with outreach and engagement as early as possible after a violent injury. Clinicians meet patients and families at the hospital or soon after discharge,



Fig. 18.1 The cycle of violent injury. In many settings, patients are treated and discharged without any attention to or discussion of their normal, expectable trauma-related physical and emotional reactions. Many patients manage their hypervigilance, re-experiencing, and numbing by carrying weapons to feel safe or regulating their emotions with substances. Both of these strategies have been shown to increase risk for injury. Many patients trapped in this cycle see only two ways out: death or incarceration. In the Healing Hurt People model, treatment in the trauma unit is viewed as an opportunity for psychoeducation about trauma reactions, engagement, offering ongoing support, and establishing trust to make it possible for patients to accept the support offered

offer support, and provide them with psychoeducation about trauma and tools for coping with trauma reactions. HHP team members work to establish trust and may provide crisis intervention, safety and needs assessment, and practical assistance. Talking about how violence and trauma can shape day-to-day life and ways to manage common trauma reactions is central to the HHP model during engagement and throughout all program phases. HHP's core services after discharge are intensive case management (ICM) and support groups that use the Safety, Emotions, Loss, and Future (S.E.L.F.) trauma psychoeducation framework (Bloom, Foderaro, & Ryan, 2006).

For patients and families who elect to participate after hospital discharge, HHP staff conduct an intake/assessment that includes attention to family structure, work/education history, ACEs, substance use, safety, criminal justice involvement, PTSD, and depression. HHP then provides ongoing ICM, i.e., high-intensity support occurring primarily in patients' homes and communities. ICM is structured around patients' self-identified goals and may focus on a variety of areas, including safety, physical and mental health, education, employment, housing, justice system involvement, and substance use. HHP staff work with and on behalf of patients to access resources that can help them achieve their goals.

Along with ICM, S.E.L.F. groups are central to the HHP Model. Groups typically last 12–15 weeks and focus on attaining psychological, social, moral, and physical *SAFETY*, including avoiding reinjury and retaliation; identifying and managing *EMOTIONS*; grieving *LOSS* related to deaths of loved ones and from physical injuries and/or working on the *LETTING GO* required to make change; and constructing a vision for the *FUTURE*. S.E.L.F. groups are not didactic; they create a safe space for conversations about some of the core domains in which patients struggle. One of the most important functions of S.E.L.F. groups is the creation of community or, as HHP participants have described it, “brotherhood,” “fellowship,” or “a positive clubhouse.”

The Healing Hurt People-Chicago (HHP-C) Experience

HHP-C is a partnership between two level 1 trauma centers: the Cook County Trauma Unit (CCTU) at John H. Stroger, Jr. Hospital of Cook County, and the Pediatric Emergency Department at University of Chicago Medicine Comer Children's Hospital. HHP-C is co-directed by CCTU's violence prevention coordinator and chaplain, Rev. Carol Reese, MDiv, LCSW, and Brad Stolbach, PhD, trauma psychologist and associate professor of Pediatrics at the University of Chicago. The HHP-C team began working with HHP-P in late 2013 to adapt and implement HHP with CCTU and Comer patients aged under 19.

Most HHP-C services are provided by master's level Trauma Intervention Specialists (TIS). Since its inception, the program has provided outreach/engagement services to 577 patients, 158 (27.4%) of whom participated in post-engagement services for any length of time. Two-thirds of these patients received services for at least three months, including 80 (50.6%) who remained active in the program for

six months or longer. The length of program participation ranges from a single session to several years. Reasons for ending vary and may include achievement of goals, family relocation, or lost contact.

Successes

Patient identification Processes to facilitate identification of every patient with a community violence-related injury include (1) referrals from physicians and hospital staff, (2) receiving a page for all Comer trauma activations, (3) daily review of Comer trauma activations and CCTU admissions, and (4) daily review of *Chicago Tribune* shootings coverage. Team members embedded in both trauma centers and a *Notify HHP* order in the electronic medical record have helped to ensure that very few patients fall through the cracks.

Participant outcomes Table 18.1 shows outcomes for patients who participated in HHP-C for six months or longer. One of the most heartening results to date is that only 6% of participants experienced a level 1 trauma reinjury while in the program. Patients consistently report that they feel safe with HHP-C team members and fellow participants and that the program helps them to “not feel alone” and gives them hope for the future. At the conclusion of his first S.E.L.F. group cycle, the patient whose description of PTSD was quoted earlier said, “When I first came here, I didn’t really know what it was gonna come out to. I thought it was gonna be like us just sitting in circles, talking about what happened to us. But I didn’t think people really cared about African American boys, you know, young, like we just get shot, go to the hospital, and go home. And then I came here, and I seen something different, learned something new. I heard everybody’s stories.... When I got shot I didn’t wanna do nothing no more. I used to spend all my time in gyms, working out, just doing fun outside. Y’all made me look different. Y’all made me wanna do everything again, be able to go outside, kick it with people, family. I guess you could say I got my life back.”

Table 18.1 Outcomes for 74 HHP-C participants with 6 or more months in program

| | |
|---|-----|
| Safety/avoidance of any reinjury | 89% |
| Safety/avoidance of level 1 trauma reinjury | 94% |
| No new justice system involvement | 83% |
| No attempts to retaliate | 98% |
| Lower aggression | 83% |
| Increased self-efficacy | 89% |
| Increased service utilization | 91% |
| Decreased drug and alcohol use | 60% |
| Decreased depression | 69% |
| Decreased PTSD symptoms | 73% |

PTSD post-traumatic stress disorder

Peer leadership/employment HHP-C has developed opportunities and partnerships that simultaneously enhance service quality, benefit patients, and provide part-time paid work for some participants. Several long-time HHP-C patients, including the one quoted above, co-facilitate S.E.L.F. groups with staff. Peer-led groups create a highly supportive atmosphere in which patients are able to explore issues in-depth. For example, in one S.E.L.F. group, a peer facilitator taught others how to meditate, prompting the group members to incorporate meditation time into every subsequent session. Numerous patients serve on HHP-C's trauma-informed care (TIC) training team with pediatricians and HHP-C staff. The team teaches medical personnel about the effects of trauma and about TIC principles related to safety, screening, understanding context, limiting re-traumatization, and discharge planning. Providers hear advice directly from HHP-C participants and can ask questions about the patient experience.

Project FIRE (Fearless Initiative for Recovery and Empowerment)

Project FIRE was created by glass artist Pearl Dick and HHP-C co-director Brad Stolbach in 2015. A partnership between HHP-C and ArtReach Chicago, Project FIRE combines glassblowing, glass arts education, mentoring, employment, and S.E.L.F. trauma psychoeducation. Twenty-five HHP-C patients have worked for Project FIRE. Patients work in a hot shop together with a master artist and a mentor instructor who has survived violence, and then they attend a S.E.L.F. group. They are paid by the hour and can also earn 70% of the sale price of individual pieces. Patients report that Project FIRE has helped them to envision a future for themselves, changed how they view themselves and how others view them, and given them a "second family."

Challenges

Ongoing threat of extreme violence and availability of guns The ubiquity of violence in our patients' neighborhoods endangers them and the TIS who work with them. Most HHP-C patients contend with day-to-day violence, and many have lost friends and loved ones to homicide during their participation in the program. HHP-C staff fear for their patients' safety as well as their own, particularly when transporting patients, both because they have discovered patients carrying guns and because some patients are targets. HHP-C has implemented safety protocols to limit solo TIS time in the field, particularly after dark, and to standardize direct communication with patients and families about possible safety concerns, especially when visiting or transporting patients. To address emotional wear and tear on staff and decrease the potential for staff isolation, HHP-C has added reflective supervision time, decreased caseload size, and emphasized team building.

Participants' substance use/abuse Using alcohol and drugs, especially marijuana, has long been a primary strategy for many patients to manage trauma reactions and emotions. Although alcohol and drug use is adaptive in some situations, it can interfere with achievement of goals and has proven to be the most difficult area to change for many clients. To date, the scarcity of treatment for patients with few resources has prevented partnerships with drug treatment providers, but this is a future HHP-C goal.

Inadequate funding/disruptions in funding Similar to many HVIPs, HHP-C has been almost entirely funded by “soft money” (foundation or government grants and donations). Budgetary uncertainty year to year can exacerbate staff burnout, increase attrition, and interfere with staff recruitment. The never-ending search for new funding sources and the maintenance of existing ones saps resources that could be better used for providing and supporting quality patient care. For all the reasons outlined in this chapter, HHP-C continues to make the case that hospital administrations interested in successful HVIPs should not view these programs as optional but should invest in them up-front, just as they do in other types of patient care.

Clinical Pearls

The following suggestions come from our patients and/or our experience providing trauma-informed care:

- Normalize trauma reactions and provide practical tools for coping with them. Explain that re-experiencing is common and is not a sign of weakness or mental illness. Provide anticipatory guidance emphasizing that patients' reactions are not crazy and that past traumatic events are not happening now. Teach simple grounding techniques, such as deep breathing, that patients can use to remind themselves where and when they are if trauma reactions occur.
- Avoid making judgments about patients' behavior and circumstances. Black and brown youth are often viewed by systems as having moral, intellectual, or behavioral deficits. One of the most important things a provider can do is to change the question “What's wrong with you?” to “What happened to you?” *Do not* ask specific questions about circumstances that led up to injuries because these may be perceived as victim blaming. *Do* ask general questions about past trauma, losses, and anything that patients and families could use support with.
- Connect and respect. Patients want to be seen as fellow human beings. Pay attention to the whole patient, not just to their injuries or presenting complaints. Express empathy, be friendly, and have a sense of humor (when appropriate). Ask for permission to enter patients' rooms, to touch them, to speak to family members, etc. Introduce yourself and your role and explain what you are doing and why.

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Chapter 19

Clinician Unconscious Bias and Its Impact on Trauma Patients



Nidhi Rhea Udyavar, Ali Salim, and Adil H. Haider

Introduction

Over the last two decades, racial and ethnic disparities in the quality of trauma care have been uncovered and examined. The study of these disparities has led to the proposal of several underlying mechanisms by which minority patients experience suboptimal care, even in the high-acuity, increasingly algorithm-based field of trauma. Researchers have speculated that characteristics specific to the physician, including personal attitudes and belief systems about certain groups or individuals, contribute to the existence and persistence of healthcare disparities in general.

The management of the injured patient presents a unique set of interpersonal challenges because these patients often present in extremis and/or in an altered state of consciousness, which initially precludes the clinician from establishing rapport and building trust. Many trauma patients also have complex social situations and may have engaged in behaviors that contributed to their injury, further complicating the interpersonal dynamics between the patient and members of the healthcare team. However, in spite of this, physicians endeavor to provide equitable care to all patients and to uphold the ethical standards of the profession, and there is no evidence to suggest that trauma surgeons consciously treat patients differently because of their own attitudes or explicit biases. Physicians' *implicit* biases, on the other

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hand, have been identified as possible contributors to the differential treatment that minority patients receive in all facets of the healthcare system, including trauma care.

In this chapter, we will define implicit, or unconscious, bias as it pertains to healthcare and provide an overview of the peer-reviewed literature on unconscious bias. We will explore how trauma care is particularly susceptible to the consequences of clinician unconscious bias and how the injured patient is affected by such biases.

Unconscious Bias: Definition

Unconscious or implicit bias is defined as a preference for a social group (racial, ethnic, social class, gender and gender identity, etc.) that is automatic and often not consciously acknowledged by the individual (Devine, 1989). Indeed, unconscious biases are frequently at odds with one's personal beliefs, values, and behaviors (Devine, Forscher, Austin, & Cox, 2012). Exposure to culturally ingrained stereotypes, or sets of associations between some trait and a specific social group, is thought to inform and maintain individuals' unconscious biases. Indeed, multiple randomized studies have successfully demonstrated that simple awareness of a stereotype distorts processing of information about individuals within certain social groups (Biernat & Manis, 1994; Hodson, Dovidio, & Gaertner, 2002; Isaac, Lee, & Carnes, 2009; Moss-Racusin, Dovidio, Brescoll, Graham, & Handelsman, 2012).

Humans form belief systems on the basis of information about experiences and interactions, which is reinforced until their perceptions and recollections become automatic. To some degree, this process maximizes the efficiency of decision-making and thus likely represents an advantage in human evolution. Overcoming or reducing stereotyping requires considerable cognitive resources, and, when individuals are already under a heavy cognitive load, this task is even less feasible (Chapman, Kaatz, & Carnes, 2013). The fact that implicit biases are typically formed early in life and can inform behaviors in individuals as young as 3 years old speaks to the instinctiveness of humans' inclination toward stereotyping and developing unconscious biases.

Measuring Implicit Bias: The Implicit Association Test

Because implicit biases are so pervasive in human society, public norms surrounding the expression of overt prejudice interfere with techniques that seek to measure individuals' self-reported biases. Accordingly, tools have been developed that indirectly measure unconscious bias through examination of judgment latencies for tasks that are modulated by respondents' attitudes and beliefs. The most rigorously validated of these response latency tools is the Implicit Association Test (IAT), which was developed in 1998 by Greenwald, McGhee, and Schwartz (1998). To

examine racial and ethnic bias, the IAT captures the underlying automatic evaluation of a sequence of association exercises, in which respondents are instructed to spatially categorize words as either positive or negative while looking at photographs of faces of either Black or White people. The instructions for categorizing the words by attribute dimension are reversed, and the time it takes for respondents to acclimate to the response assignment provides an indirect measure of the individual's implicit attitudes about Black and White people. The IAT is an effective and validated measure of implicit bias because it does not rely on self-report, which is easily influenced by social desirability and awareness of the controversial nature of overtly expressing certain attitudes. These features of self-report are corroborated by the frequently reported discordance between individuals' scores on the IAT and scores on explicit measures of prejudice (Rudman, Greenwald, Mellott, & Schwartz, 1999).

Since its inception, the IAT has been adapted to measure multiple dimensions of social category bias, including gender, body habitus, and social class. The race IAT has been cited in hundreds of studies—mostly in disciplines that are beyond the scope of this chapter—and has been validated in many contexts. It is available for public reference at www.implicit.harvard.edu.

Unconscious Bias in Healthcare

Because it is virtually impossible for a physician not to have any stereotypes, it should be presumed that all members of the healthcare team have at least some implicit biases. Indeed, a 2012 study analyzed the results of the IAT in 404,277 individuals, 2535 of whom were physicians (Sabin & Greenwald, 2012). The authors found that the majority of these physicians had pro-White implicit biases and that the strength of these implicit biases exceeded self-reported attitudes toward minority patients in all racial groups except Black physicians. The relationship between such biases and treatment decisions according to patients' race remains a topic of controversy. Unsurprisingly, most physicians do not admit to having any explicit racial biases (Blair et al., 2013; Green et al., 2007; Penner, Blair, Albrecht, & Dovidio, 2014). Nevertheless, among the general population of the United States, implicit pro-White racial biases are exceedingly common, even among Black individuals (Nosek, Banaji, & Greenwald, 2002). A seminal investigation by Green et al. showed that, out of 287 internal medicine and emergency medicine resident physicians, the majority harbored pro-White implicit biases (Green et al., 2007). The study further captured the implications of such biases by providing participants with a clinical vignette of a patient (either Black or White) presenting with signs and symptoms of acute coronary syndrome, in which timely initiation of thrombolysis was clinically indicated. Participants with stronger pro-White implicit biases were less likely to offer the hypothetical Black patients the appropriate treatment. These findings were the first to suggest that physicians' implicit biases could be harmful to socially disadvantaged patients.

Another study focused on pediatricians' clinical decision-making as a function of their racial implicit biases (Sabin & Greenwald, 2012). Using a series of four clinical vignettes, the authors found that there was a statistically significant association between increased pro-White implicit bias and reduced likelihood of prescribing pain medication for Black patients. This association was not seen among the simulated White patients.

Bias in Trauma

The management of injured patients entails a unique set of challenges, obstacles, and pressures on the clinician and the healthcare team. Trauma care is characterized by its acuity, lack of predictability, and propensity for mental fatigue, conditions that increase the cognitive and emotional demand on the surgeon (Johnson et al., 2016). Because many decisions in trauma must be made expeditiously, without the benefit of having developed a relationship with the patient, the likelihood of relying on stereotyping and implicit associations to facilitate time-sensitive diagnosis and treatment is increased among those providing care for the trauma population. Depending on the trauma center, trauma surgeons may be particularly fatigued and/or vulnerable to burnout because of long hours and rigorous work schedules (Dimou, Eckelbarger, & Riall, 2016). Additionally, studies have demonstrated that many of the surgeons who treat trauma patients do so reluctantly, in part because of the perception that participating in trauma call has an adverse effect on a surgeon's designated clinical practice and economic viability. The lack of reimbursement for trauma patients as compared with patients undergoing elective surgery may contribute to negative, albeit subconscious, attitudes toward the trauma patient population. Similarly, medicolegal concerns associated with this population may factor into some trauma surgeons' countertransference toward these patients (Esposito, Maier, Rivara, & Carrico, 1991).

The management of injured patients involves multiple components of the healthcare system and typically takes a team-based approach in which the trauma surgeon's clinical decisions are supported and executed by physician assistants, nurse practitioners, case managers, consultants from other specialties, and nurses. At academic institutions that provide trauma care, the healthcare team may also include residents at various levels of training and with a wide range of interests in traumatology, as well as research scientists and research assistants who may interact with trauma patients. The increasingly multidisciplinary nature of trauma care ensures that injured patients routinely interact with a large panel of healthcare professionals from various specialties and departments who have diverse skill sets and levels of training; therefore, one can assume that these patients are also exposed to a broad range of explicit and implicit biases from such professionals.

The racially, ethnically, and socioeconomically diverse nature of the trauma population has the potential to elicit behaviors from providers that are contingent upon unconscious biases. Many of the highest-volume trauma centers that treat the bulk of the penetrating injuries in the United States are located in urban environments

that are predominantly composed of lower-income and minority patients. These areas generally experience disproportionately higher rates of violent crimes, domestic violence, and drug- and alcohol-related accidents. Therefore, we must acknowledge the possibility that trauma surgeons exposed to the more destructive societal consequences of poverty and racial and/or economic segregation could over time develop unconscious biases in favor of the more socially advantaged populations. Even those trauma surgeons who practice in rural areas or urban or suburban regions with lower rates of violent crime are entrenched in the everyday human drama that makes trauma care interesting but challenging. That all these factors would combine to form a milieu that is uniquely conducive to the formation of unconscious biases is unsurprising (Fig. 19.1).

Furthermore, traumatology has recently experienced a dramatic paradigm shift in favor of an algorithmic approach to the management of injured patients that is based on the mechanism of injury and various evidence-based protocols. While this approach has vastly improved the overall quality of clinical care, it is not apparent that trauma patients are any more or less satisfied with the interpersonal aspects of their treatment. Indeed, one could assume that algorithmic management strategies reduce the potential for shared decision-making and development of rapport between the physician and patient. Reliance on clinical treatment algorithms automates trauma care to a certain extent, thus tempering the humanism and conscientiousness that could otherwise have prompted the surgeon to counter his or her own implicit biases toward a patient's social group.

There is empirical evidence of trauma and acute care surgeons' unconscious biases in favor of White, socially advantaged patients. A cohort of 271 trauma surgeon members of the Eastern Association for the Surgery of Trauma (EAST) completed the IAT and a series of questions pertaining to 9 clinical vignettes designed

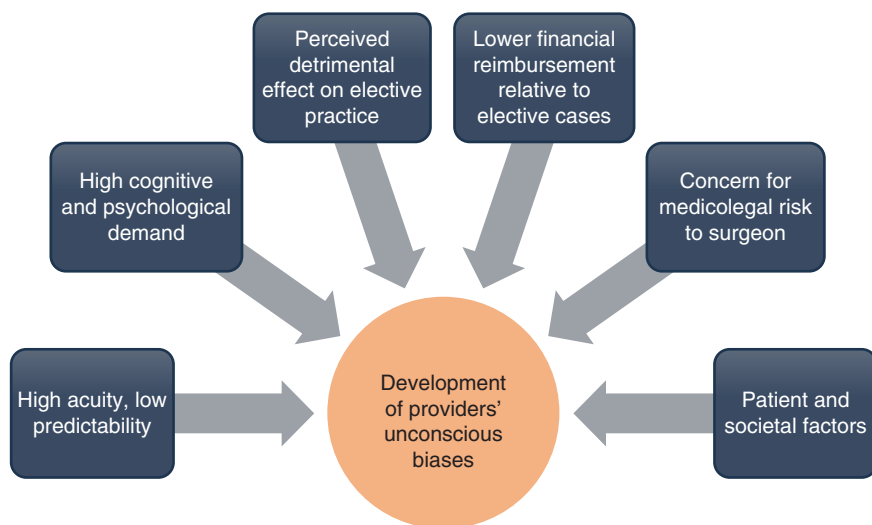


Fig. 19.1 Factors specific to trauma care that predispose trauma surgeons and other members of the healthcare team to develop unconscious biases about the populations they serve

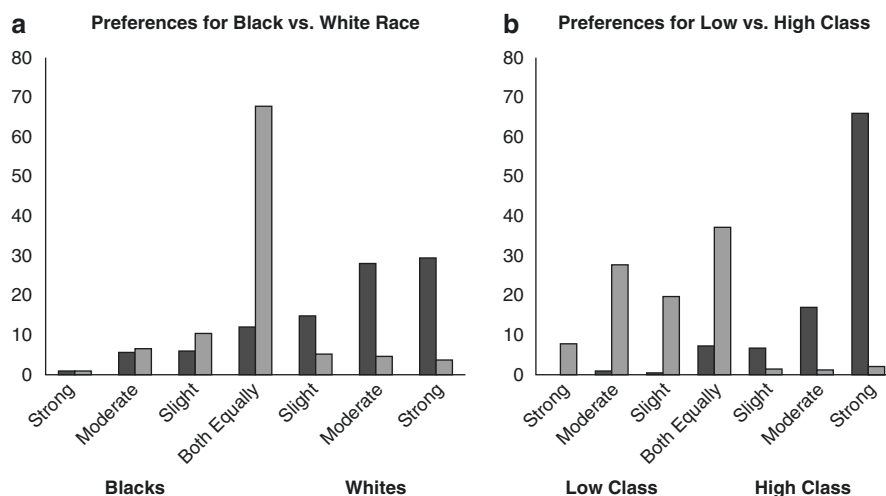


Fig. 19.2 (a) Implicit (dark gray) and explicit (light gray) race preferences among EAST surgeons. (b) Implicit and explicit class preferences among EAST surgeons. EAST Eastern Association for the Surgery of Trauma. (Adapted with permission from Haider et al. (2014))

to assess the relationship between unconscious biases and clinical decision-making. Participants were blinded to the purpose of the study to reduce the impact of social desirability bias and the desire to exhibit behaviors and attitudes that are deemed appropriate by current social norms. The results of the IAT indicated that the majority of participants had unconscious biases in favor of Whites (73.5%) and upper social class individuals (90.7%) (Haider et al., 2014). The contrast between these unconscious biases and the surgeons' reported explicit preferences is shown in Fig. 19.2. These results are reminiscent of the previously mentioned study by Green et al. (2007) that assessed the unconscious biases of emergency medicine and internal medicine trainees and of national data that showed that approximately 80% of White Americans harbor pro-White implicit biases (Nosek et al., 2002).

Does Unconscious Bias Affect Clinical Decision-Making in Trauma?

As stated previously, unconscious pro-White preferences can be a predictor of disparate treatment recommendations in simulated scenarios involving patients with acute coronary syndrome, but this relationship has not been reproduced in the trauma population. The results of the study by Haider et al. (2014) that examined the relationship between vignette-based decision-making among trauma surgeons showed no statistically significant interaction between surgeon's unconscious biases and treatment approach. On a more granular level, however, there was a demonstrable

predictive effect of pro-White unconscious bias on perceptions and attitudes toward minority patients that could, in practice, influence management. For example, one vignette involved a patient who underwent an emergent splenectomy and developed pain, fever, tachycardia, and altered mental status in the postoperative setting. The test surgeon was then asked to make decisions regarding the credibility of the patient's self- and family-reported medical history and the need to screen for alcohol abuse and initiate treatment for presumptive alcohol withdrawal. When the patient in the scenario was specified as Black, responses favored the possibility of an undisclosed history of alcohol abuse and participants were more likely to attempt to corroborate the social history by requesting information from the family and to implement pharmacologic prophylaxis for alcohol withdrawal. The IAT scores were nonsignificant predictors of these responses, however, which speaks to the subtlety of the cognitive, social, and behavioral mechanisms that drive differential decision-making for minority patients.

The propensity for unconscious bias-driven differences in the management of acutely ill surgical patients was further explored in a 2015 study involving a total of 215 general trauma surgeons, neurosurgeons, urologists, otolaryngologists, orthopedic surgeons, anesthesiologists, emergency medicine physicians, and intensivists at a single institution (Haider et al., 2015). Because traumatic injuries can involve multiple organ systems and require clinical contributions from any or all of the aforementioned types of clinicians, this investigation sought to get a broader impression of the trauma systems in which injured patients receive their care. Using methods similar to those described previously, the authors found that unconscious biases favoring White, upper-class patients were present across all specialties and levels of training. Differential treatment was observed in 3 of the 27 possible management decisions presented in the 9 clinical vignettes, but multivariable analysis controlling for physician age, sex, and explicit bias showed no statistically significant association between the IAT score and these decisions. For example, respondents presented with a lower-class patient with a mechanism of injury that necessitated cervical spine imaging were less likely to order magnetic resonance imaging (MRI), even when clinically indicated. IAT score was not a predictor of this choice, however (Haider et al., 2015).

Surgical nurses have also been evaluated for their unconscious race and social class biases, and nursing considerations were examined through the use of clinical vignettes. Again, the results of this single-institution study involving 245 surgical registered nurses (RNs) who routinely participate in trauma care demonstrated a statistically significant pro-White, pro-upper-class unconscious bias. Similar to previous studies, these biases did not correlate with differences in decision-making, although some patterns of behavior and perceptions toward minority patients emerged from the data. For instance, in one vignette, nurses assessing a lower-class Black patient who demonstrated restless behavior after undergoing a lower extremity amputation were more likely to conclude that the patient was agitated and to request pharmacologic sedation or restraints for the patient or both (Haider et al., 2015).

Results from these three studies, which are summarized in Table 19.1, represent the entirety of the existing body of peer-reviewed literature on unconscious

Table 19.1 Summary of peer-reviewed original investigations describing clinician unconscious bias and its role in trauma surgical care

| Title | First author (year) | Study population | Demonstrated pro-White, pro-upper-class bias? | Demonstrated statistically significant relationship between bias and treatment? | Notable example(s) of perception and treatment differences for minority patients |
|--|-----------------------|--|---|---|---|
| Unconscious race and class bias: its association with decision-making by trauma and acute care surgeons | Haider et al. (2014) | 248 trauma surgeon members of EAST | Yes | No | Participants were more likely to believe that Black trauma patients displaying restless behaviors were agitated/represented a danger to themselves and others Black patients with tachycardia and altered mental status in the immediate postoperative setting were more likely to be queried for a history of alcohol abuse/withdrawal |
| Unconscious race and social class bias among acute care surgical clinicians and clinical treatment decisions | Haider et al., (2015) | 215 clinicians from various specialties involved in acute surgical care and various levels of training | Yes | No | Participants were more likely to generate a differential diagnosis favoring pelvic inflammatory disease in a Black female patient with right lower quadrant pain Injured lower-class patients with an indication for cervical spine imaging were less likely to undergo MRI Black patients with tachycardia and altered mental status in the immediate postoperative setting were more likely to be queried for a history of alcohol abuse/withdrawal |

Table 19.1 (continued)

| Title | First author (year) | Study population | Demonstrated pro-White, pro-upper-class bias? | Demonstrated statistically significant relationship between bias and treatment? | Notable example(s) of perception and treatment differences for minority patients |
|--|-----------------------|---------------------|---|---|---|
| Unconscious race and class biases among registered nurses: vignette-based study using implicit association testing | Haider et al., (2015) | 245 surgical nurses | Yes | No | Participants were more likely to conclude that a Black patient who appeared distressed after a visit from his son had an adversarial relationship with him Participants were more likely to assume that a lower-class patient who appeared anxious preoperatively did not understand the informed consent discussion |

EAST Eastern Association for the Surgery of Trauma

bias in trauma. It is apparent from the findings described by these investigations that all members of the healthcare team are susceptible to the societal, cultural, historical, and personal influences that create individual unconscious biases but that the cognitive processes underlying decision-making in trauma and acute surgical care may be distinct from the subconscious, instinctive processes influenced by unconscious racial and social class biases. The relatively small sample sizes in these studies, as well as the use of vignettes to simulate actual clinical experiences, should be noted as limitations in the development of an evidence-based understanding of how unconscious biases may drive disparate treatment and, by extension, healthcare inequities in trauma. Although vignettes have been used in many studies to investigate decision-making, it is entirely possible that participants’ responses to vignette-based simulated scenarios may diverge from their real-life habits. In the absence of a more accurate way to measure the effect of unconscious bias on clinical care that is still practical and ethical, however, it remains challenging to interpret any conclusions that unconscious biases do not inform patient care, when healthcare disparities persist even in the face of systematic reforms.

The Unmeasured Impact of Unconscious Bias on Trauma Patients

While the available literature has yet to establish that providers' unconscious biases have a tangible effect on the quality of care that minority patients receive, there is much to be learned from other disciplines about how unconscious biases affect patients' experiences. Black patients in the primary care setting, for example, were shown to experience less participatory communication from their physician, as well as less patient-centeredness. Primary care physicians with higher IAT scores (which translates to more pro-White implicit bias) demonstrated more verbal dominance toward Black patients, and these patients also perceived less respect from those physicians and felt less confidence in the quality of those physicians' recommendations. Furthermore, primary care physicians in this study exhibited an unconscious association between Black race and non-compliance, and this bias was also found to be linked to the communication process in that it was a predictor of the physician using slower speech patterns, more verbal dominance, and a more negative affect when counseling Black patients (Cooper et al., 2012). The higher acuity associated with trauma care calls for a different communication skill set than primary care, but trauma surgeons must nevertheless approach the care of all patients with an equitable attitude of patient-centeredness and respect for the individual's autonomy. Few, if any, studies exist that examine trauma patients' perception of trauma surgeons' communication, but this approach could provide valuable insight into the role of unconscious bias in the management of injured patients.

Another important psychosocial construct that has been examined in relation to providers' unconscious biases is the concept of stereotype threat, defined as the psychological and physiologic response to perceived association between the individual and the negative stereotypes generally attached to the individual's social group. Minority patients' experiences with stereotype threat in various healthcare settings have been documented in the literature. For example, in response to the widely held unconscious bias that healthcare professionals harbor about non-White patients' tendency toward nonadherence to treatment recommendations, minority patients may be less inclined to trust that the recommended treatment is truly in their best interest as opposed to a subversive effort to ensure compliance, thereby actually increasing the likelihood that the patient will not adhere to the recommended treatment (Burgess, Warren, Phelan, Dovidio, & van Ryn, 2010). The notion of such self-fulfilling prophecies and their reinforcement of negative stereotypes underlying differences in healthcare outcomes for minority patients has been studied only in disciplines other than traumatology, but the fundamental principles can be applied in traumatology to examine how trauma clinicians' unconscious bias could lead to disparities in quality of care. Assumptions that patients with work-related injuries are opportunistic or weak or both, for instance, can have the effect of subtly motivating the patient to behave in a manner that is consistent with these associations (Niemeyer, 1991). Injured minority patients may also communi-

cate differently with members of the healthcare team as a result of their fear of being judged or labeled negatively according to deeply ingrained stereotypes surrounding non-White individuals and violence, regardless of the individual clinician's degree of unconscious bias (Havranek et al., 2012). It is important to note that it is the cumulative effect of a minority patient's lifetime experience with both conscious and unconscious biases against their racial group that leads to stereotype threat, not necessarily a direct effect of the current clinician's perceived biases. Acknowledging the aggregate impact of societal unconscious bias, from which healthcare professionals are not exempt, may be an important component of improving the quality of care and interpersonal communication with certain non-White patients in the trauma setting.

Potential Interventions for Mitigating Unconscious Biases

While the direct effect of clinicians' unconscious biases on clinical outcomes in trauma remains ambiguous because of methodological limitations, there is plentiful evidence about the psychological consequences for minority health of a society rife with pro-White biases. Mitigating the unconscious biases of healthcare professionals involved in trauma care is an actionable strategy for reducing the large-scale inequities in minority patients' experience with the healthcare system.

Proposed interventions for mitigating unconscious bias are based on the assumption that most healthcare professionals do not intentionally harbor overtly negative attitudes toward minorities and persons of lower social classes and genuinely wish to provide equitable care to all patients. Burgess, Van Ryn, Dovidio, and Saha (2007) have identified cognitive exercises and skills-building that promote individuation (focusing on the particular attributes of an individual patient) and over categorization (perceiving the patient in the context of his or her social group). These strategies emphasize (1) enhancing internal motivations to reduce bias; (2) increasing the understanding of the psychological basis of bias; (3) improving providers' confidence in successfully interacting with patients of different racial, cultural, and socioeconomic backgrounds; (4) building skills for emotional regulation; and (5) partnering with patients to empower them to participate in their care (Burgess et al., 2007). The first two exercises require providers to reflect on and accept their own biases as a normal component of human cognition, thus facilitating awareness of the negative impact of such prejudices rather than pathologizing the individual's biases. The last two exercises challenge providers to apply mindfulness techniques to foster positive emotional states during the clinical encounter to promote empathic communication that empowers the patient to be actively involved in his or her own care. Positive emotional states are important because there is evidence that negative emotional states increase the likelihood that fatigued, cognitively stressed providers will rely on categorization and stereotypes to inform their decisions (Johnson & Fredrickson, 2005).

Improving providers' belief in their ability to successfully communicate with patients from different social groups is an important and accessible strategy for reducing unconscious bias. In a study comprising 16 attending surgeons and 15 surgical residents across four institutions, cultural competency training specific to the surgical context was identified as a deficiency in the current surgical training paradigm. Participants noted that aspects of patients' cultural background can decisively inform their care; in addition, there are challenges specific to surgical care that carry cultural undertones, such as the discussion of informed consent and postoperative pain control (Changoor et al., 2019). The ability to navigate such cultural differences can reduce the anxiety that some providers may feel when interacting with minority patients, which tends to manifest as avoidant or standoffish communication behaviors. A novel curriculum for building cultural dexterity, i.e., the ability to apply knowledge and skills in real time when communicating with patients from diverse cultural backgrounds, was developed to empower surgical residents to provide patient-centered care tailored to the individual patient's cultural context. This curriculum, developed by experts in the field of disparities research and implicit bias, has been pilot tested at three general surgery residency programs as of 2018, and there are plans to implement it in a crossover randomized trial across eight different academic institutions (Udyavar et al., 2018). One of the goals of this trial is to examine whether providers' confidence in treating patients from cultural backgrounds distinct from their own improves as a result of cultural dexterity training.

Conclusion

Unconscious biases are pervasive in American society, the legacy of a lengthy and troubled history of institutional racism. Despite the altruistic intentions and outwardly egalitarian views held by most physicians and healthcare professionals, unconscious bias can still influence the quality of care and the perception of care processes experienced by minority patients, thus perpetuating healthcare disparities. As a discipline defined by high-stakes, time-sensitive, algorithmic, and mentally fatiguing management decisions, trauma care may be more susceptible to the development of unconscious biases. The evidence from vignette-based simulations does not support the hypothesis that such unconscious biases influence clinical decision-making in trauma, although there are limitations to the conclusions that can be drawn from vignette-based simulations of clinical scenarios. Nevertheless, it is evident that members of the healthcare team serving injured patients do harbor unconscious biases, and educational and psychologically based interventions to reduce unconscious bias are needed to foster a more equitable environment to help trauma patients recover.

Clinical Pearls

- Trauma patients represent a clinically, socioeconomically, and demographically diverse population that may be susceptible to differential treatment by the healthcare system in part because of the presence of individual unconscious bias.
- Educational interventions, including dedicated training in cross-cultural communication for surgical trainees, has the potential to reduce unconscious bias in providers by increasing trainees' skills at perspective-taking, trust-building, and empathic interaction. Improving providers' confidence in their ability to treat patients of diverse cultural backgrounds can also attenuate unconscious biases against certain minority groups, as shown in the literature.
- While certain clinical decision-making scenarios have been demonstrated to be equivocally influenced by individuals' unconscious biases, the psychological and societal consequences of unconscious bias are well documented and may play a role in the difference in health-seeking behaviors, adherence to treatment recommendations, and social determinants of health, all of which affect the quality of trauma care.

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Chapter 20

The Establishment and Evolution of Acute Care Surgery



L. D. Britt

Establishing the specialty “Acute Care Surgery” required the unwavering effort of many individuals. Acute Care Surgery, an evolving tri-disciplinary specialty, addresses the concern highlighted by Dr. William Steward Halsted when he stated that “...every important hospital should have on its resident staff of surgeons at least one who is well trained and able to deal with any emergency” (Halsted, 1904). The evolution of Acute Care Surgery did not occur *de novo*. On the contrary, several forces created an optimal environment for its birth and development, including a precipitous decline in the surgical workforce that would be involved in the management of such emergencies, along with the well-documented short supply of specialty support in the acute care setting.

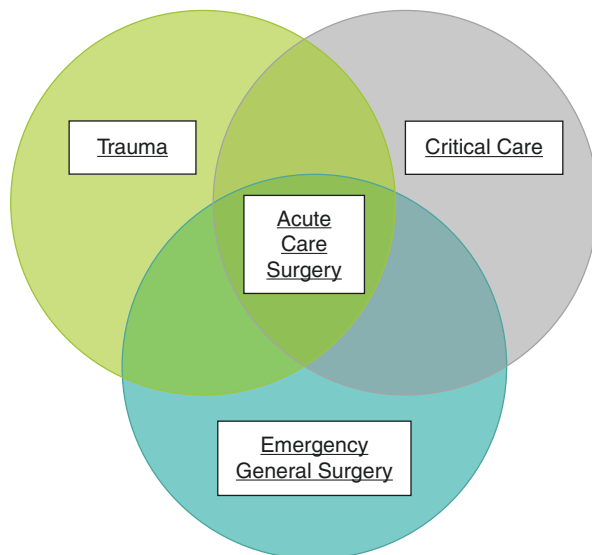
A survey conducted by the American College of Emergency Physicians in 2005 (American College of Emergency Physicians, 2005) showed that nearly three-quarters of emergency department medical directors believed that they had inadequate on-call specialty coverage. In that same survey, orthopedic, plastic, and neurological surgeons, as well as otolaryngologists and hand surgeons, were reported as being in short supply. A fact sheet on “The Future of Emergency Care in the United States Health System,” produced by the Institute of Medicine of the National Academies in 2006, corroborated these findings (Institute of Medicine, 2006). Although some controversy still exists regarding the scope of practice and essential requirements for this specialty, Acute Care Surgery is a new and unique surgical specialty. The label “acute care surgeon” has been erroneously applied to “surgical hospitalists” and “emergency general surgeons.” However, the true definition of Acute Care Surgery embodies three specialty components: trauma surgery, emergency general surgery, and surgical critical care (Fig. 20.1). As a result, the general principles of Acute Care Surgery are derived from these three specialties.

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Fig. 20.1 Acute Care Surgery: a tri-disciplinary specialty



The overarching principle, which transcends each of these three components, is early and expedient medical/surgical intervention. Whether managing a patient with a perforated duodenal ulcer or enterotomies secondary to a gunshot wound to the abdomen, early diagnosis and expedient intervention make up the cornerstone of optimal management. There is no disharmony between the well-established tenets of trauma management and the general principles of Acute Care Surgery. While it is always prudent for surgeons to adhere to the basic priorities (airway, breathing, circulation, etc.) underscored in the primary survey, such an emphasis needs to be tailored on a case-by-case basis in non-trauma surgical emergencies so that timely intervention is not delayed.

For example, for a young patient who presents with a presumptive diagnosis of acute appendicitis and an obvious surgical abdomen, little attention has to be directed to the disability assessment, which is included in the primary survey. The same would be the case for many other non-trauma surgical emergencies. Because of the disparate disease entities that can lead to surgical emergencies and the unique patient populations that may be involved, it is unlikely and, perhaps, unnecessary that an all-encompassing management paradigm, such as Advanced Trauma Life Support (ATLS®) (American College of Surgeons, 2018)—arguably, the most accepted and successful practice guideline in American (and international) medicine—is actually needed. However, general principles of optimal management are, indeed, applicable, even among special populations of patients with potential surgical emergencies. Such general principles are embedded in the thrust of surgical education that continually underscores the important role of surgical judgment and prioritization of patient management.

While there are three main pillars of support for Acute Care Surgery, some degree of modification is expected because of specific institutional resources. The specialty must have the capacity and flexibility to naturally evolve. Peitzman et al. (2015) reported on a potential expanded role for the specialty. He and co-authors opined that

a critical service provided by their acute care surgeons is one of surgical rescue. In a landmark article by Ghaferi, Birkmeyer, and Dimick (2011) in *Medical Care*, the authors underscored the advantages of establishing strategies that focus on the timely recognition and management of complications once they occur. Although the outcomes were not perfect, they found that there were better outcomes at high-volume centers, where surgical rescue was initiated more expeditiously (Ghaferi et al., 2011).

From one of the best databases in the world, the American College of Surgeons National Surgical Quality Improvement Program (NSQIP), it was determined that there existed over a 10% failure-to-rescue rate in the surgical population (American College of Surgeons National Surgical Quality Improvement Program, 2013). Twenty percent of patients with the greatest risk for developing postoperative complications account for approximately 90% of failure-to-rescue cases. With complications of medical or surgical care being one of the most frequent hospital-based diagnoses (exceeding even cholecystitis, intestinal obstruction, and appendicitis), Acute Care Surgery undoubtedly offers the specialty expertise needed to provide the hospital surgical rescues required to optimally address these complications. Early intervention by a high-performance surgical team provides the best opportunity to reduce failure-to-rescue rates. In many settings, the high-performance specialist in charge of that surgical team will be the acute care surgeon.

The specialty Acute Care Surgery has been distinctly defined, although the label is not always correctly and consistently applied to what is actually being practiced. Has there been a template training model constructed for both fellowship and general surgery training? A Committee on Acute Care Surgery, first established within the American Association for the Surgery of Trauma by past President Ronald Maier, was chaired by past President Jurkovich and populated with the familiar names provided in Table 20.1. Dr. Michael Rotondo and I wrote the first vision statement and draft of the curriculum. After much input and many contributions from many individuals, a basic fellowship curriculum format was endorsed.

Relating to the curriculum, the two key questions that arise today are the following: (1) Does there need to be a revised curriculum and an update on expected case volume for Acute Care Surgery? (2) Should there be a more realistic database requirement? The answer to both questions is affirmative. There is currently no uniform and established Acute Care Surgery curriculum for general surgery specialty training, which is problematic if, in some locations, the general surgeon specialists

Table 20.1 Membership of the Committee on Acute Care Surgery

| | |
|---------------------------------|--------------------------------------|
| Gregory J. Jurkovich, MD, Chair | |
| Kim Anderson, PhD, Consultant | Ronald V. Maier, MD |
| L. D. Britt, MD, MPH | J. Wayne Meredith, MD |
| Christopher T. Born, MD | Ernest E. Moore, MD |
| William G. Cioffi, MD | Lena M. Napolitano, MD |
| Thomas J. Esposito, MD | Michael F. Rotondo, MD Vice Chair |
| David B. Hoyt, MD | Grace S. Rozycki, MD |
| Robert C. Mackersie, MD | David A. Spain, MD |
| Mark A. Malangoni, MD | Alex B. Valadka, MD |

will be expected to address this workforce need. When the model of core general surgery training is revised, Acute Care Surgery specialty must be a key component of the curriculum. Currently, there is not a universally adopted training model for both fellowship and core general surgery residency.

Adopting a sound business plan to ensure financial viability is essential. There is no long-term success without such a plan. The overarching concern is whether the current business model is, indeed, sustainable or a failed model. Some hospital administrations deem the Acute Care Surgery business model to be a failure.

While the debate is ongoing regarding the best model to sustain financial viability for an Acute Care Surgery service, the decision will undoubtedly not be based on the clinical revenues generated. Establishing a best business model would incorporate hospital subsidies, along with efforts to achieve meaningful revision of the relative value units (RVUs). There is a consensus that a sound business plan to ensure financial viability has not been endorsed as a “best practice.”

The role of “branding,” often confused with advertising, is underestimated in medicine. While a surgical or medical specialty is not a commodity, it is certainly helpful to know and appreciate the branding mantra that in other industries has withstood the test of time for decades: “create a new category; create a new brand” (Ries & Ries, 2004). The following list is an impressive example of the power of such a strategy:

- Band-Aid—the first adhesive bandage
- CNN—the first cable news network
- ESPN—the first cable sports network
- Nike—the first athletic shoe
- PowerBar—the first energy bar

Curiously, some of these names were not even the first. However, these brands created the perception that they were the first in a new category. Acute Care Surgery (trauma, critical care, and emergency general surgery) is, indeed, a new entity and needs to be branded as such. History has shown that a new brand that clearly defines a category will almost always overshadow the old brand that is stretched to encompass a new category.

Ries and Ries (2004) state that a new brand almost always beats an old brand if the category is important enough, with the ultimate winner being a new brand created exclusively for the category desired.

These brands, however, created the perception that they were the first in a new category. Acute Care Surgery (trauma, critical care, and emergency general surgery) is, indeed, a new entity and needs to be branded as such. There are some advocates for a “stretched” or line-extended brand name for Acute Care Surgery, which would carry both the category name and the brand name (i.e., “Trauma and Acute Care Surgery”). Ries and Ries (2004), however, state that a new brand almost always beats an old brand if the category is important enough, with the ultimate winner being the new brand created exclusively for the category desired, as opposed to the old brand that has been “stretched” to fit the new category.

When a new brand is introduced as a new category, the comparison factor is removed. The new brand then has a chance to ignite because another brand (the old brand) does not attempt to represent the new category. Confusion invariably ensues

when the old brand is fused with the name of the new brand. The two labels that are frequently required, however, are the new category name and the brand name. The category name is a generic word (often in lowercase letters) that includes all the components of the brand. The brand name is the proper name (spelled with uppercase letters) that specifically specifies the brand. For example, a European luxury car is the category for the brand BMW. It is doubtful that, when asked what kind of car they prefer, anyone would respond by saying a “European luxury car” instead of “BMW.” These are not trivial differences if, indeed, Acute Care Surgery is expected to reach its full potential as a new specialty.

“Line-extension brands,” such as Gatorade energy bars, Tanqueray vodka, and Eveready alkaline batteries, never caught traction. Prior to the birth of Nike, many teenage Americans wore sneakers, preferably Keds. Instead of Uniroyal, the owner of the Keds brand, putting a new brand on the new category producing the athletic shoe, the company introduced the new category with the brand “Super Keds,” and the rest is history—spelled N-I-K-E. For our specialty, “Acute Care Surgery” is the brand, and “trauma, critical care, and emergency general surgery” is the category.

Fortunately, recognition of the value of a specialty in medicine is unlike recognition of a product in the book, music, or movie industries. It is well known that if a book fails to make the best-seller lists in the first few weeks, it will likely never make the best-seller lists. In the motion picture industry, a movie will likely never become a blockbuster if it does not open with a big weekend. It is almost guaranteed that a movie will be successful, however, if it has a big opening weekend, especially if the film is first in box office receipts. The same holds true for the music industry. If a record does not do well in the opening week and the second week, it is an ominous sign. Fortunately, the success of Acute Care Surgery is not as time sensitive. Acute Care Surgery will ultimately gain recognition as a result of its impact and the value that it brings to the optimal care of severely injured and critically ill surgical patients. For this to be achieved, the Acute Care Surgery “brand” has to be accepted and promoted, improvement in patient outcomes has to be both chronicled and published, and all aspects of the science of our discipline need to continue to be advanced.

Undoubtedly, the true measure of the value of this specialty will be the demonstration of improved outcomes. Healthcare disparities are at the top of the list of the key underlying trends affecting optimal healthcare (Table 20.2). They have transcended every medical/surgical specialty, with associated severe adverse outcomes—particularly in the area of acute surgical care.

Table 20.2 Key underlying trends affecting optimal healthcare

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|---|
| Healthcare disparities in the population |
| Aging of the population |
| Increasing rates of utilization |
| Economic growth of the nation |
| End-of-life issues |
| Advances in genetics screening |
| Changes in health services delivery system |
| Efforts to weed out unnecessary or marginally beneficial services |
| Cost containment efforts |

The overarching question remains: What is the actual impact of this innovation (new specialty) on clinical outcomes? Any in-depth analysis would point to the need for implementing comparative effectiveness research (Fig. 20.2) to answer this question. The checklist item that lists “establishing outcome metrics” would have to be scored as “in progress.”

With respect to publishing, there have been some isolated reports and single-institution studies demonstrating disease-specific improved outcomes with the implementation of an Acute Care Surgery service. However, there have also been reports that have not shown a significant difference in outcomes (Earley et al., 2006; Ekeh, Monson, Wozniak, Armstrong, & McCarthy, 2008; Maa, Carter, Gosnell, Wachter, & Harris, 2007). Looking specifically at the impact this designated service has on biliary disease at the tertiary medical center at Eastern Virginia Medical Center, Dr. R. Britt and co-authors documented significant improvement in providing timely care for biliary disease, especially in patients with acute cholecystitis and symptomatic cholelithiasis, with no significant difference in operations performed or patient outcomes (Britt, Weireter, & Britt, 2009). Publications have been initially sparse. As Acute Care Surgery services mature and the patient population expands, there will undoubtedly be more robust and multi-institutional studies documenting the efficiency and favorable outcomes of using the Acute Care Surgery model.

Although they commit some problematic “branding” violations, more established conferences and symposia (e.g., the annual Point/Counterpoint, Las Vegas,

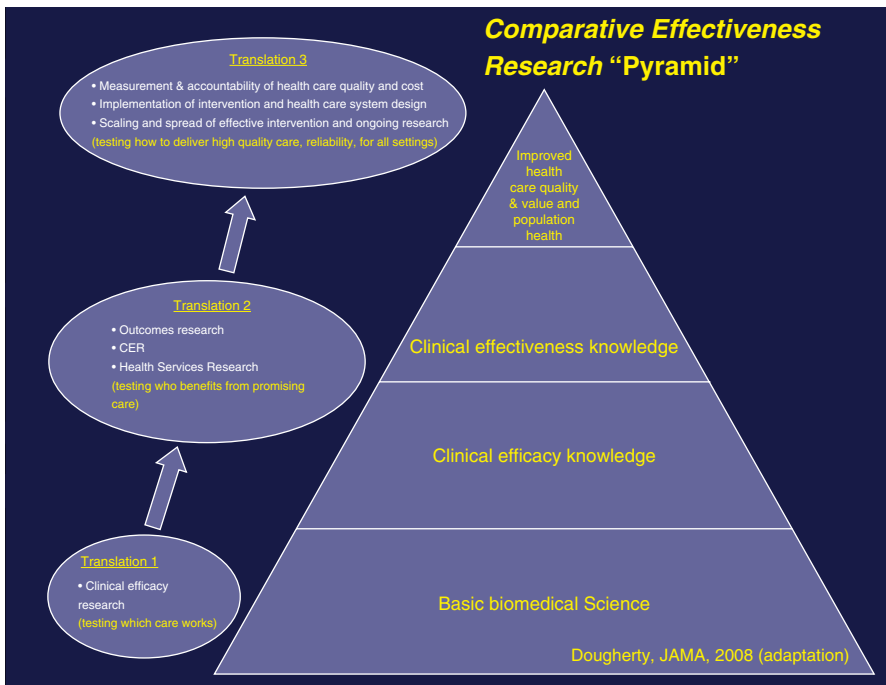


Fig. 20.2 Comparative effectiveness research “pyramid.” (Adapted from Dougherty and Conway (2008))

Kansas City, and Detroit meetings) are beginning to focus on all three elements of Acute Care Surgery (trauma surgery, emergency general surgery, and surgical critical care). Perhaps the greatest challenge for the emerging specialty of Acute Care Surgery is addressing workforce needs. The lack of an adequate workforce to care for surgical patients—who are severely injured and critically ill or have an acute surgical emergency—has been well chronicled (Britt, 2004, 2012).

An analysis of the current status of Acute Care Surgery fellowships and an awareness of the projected number of future fellowship sites (35–40 fellowships) convincingly highlights the looming workforce dilemma. The original and overarching aim was to develop a specialty to address workforce needs wherever access was suboptimal for surgical patients who are injured or critically ill. By definition, workforce shortage dictates suboptimal access. It is one of the driving forces causing the existing healthcare disparities in acute surgical care. The major underpinning of healthcare disparities is the lack of equity, which can be affected by variances in quality and access. While quality has to continually be reassessed, the warning signs of a workforce shortage in acute surgical care are more ominous.

With the broad terrain of settings where acute surgical care is required, it is clear that the Acute Care Surgery model will not be the complete answer to the nationwide workforce needs. If we consider the medical landscape of this nation, with its well-documented decline in the general surgery workforce, we find a paradox in the fact that the general surgeon specialist remains the cornerstone of emergency surgical care across the country. This is problematic because out of over 3000 counties in the USA, nearly 1200 are without a general surgeon. An additional 358 counties have at least one surgeon but are below the workforce threshold need. As a result, almost half (1525) of all US counties are below the lowest recommended standard for access to a general surgeon specialist.

There is no question that establishing both the Acute Care Surgery model and the Acute Care Surgery fellowship is the paramount advancement needed to begin addressing the healthcare disparities in acute surgical care. An expected corollary to this overarching aim to definitively address these healthcare disparities is the requirement for Acute Care Surgery to be an essential component of the core curriculum for general surgery training. The rationale for this is the fact that the general surgeon will be the one who will likely fill that workforce void in the community setting. The general surgeon specialist (a broad-based and high-performance specialist) will need to have a requisite skill set in order to provide optimal care for the surgical emergencies and critically ill patients who reside in those community settings not populated by acute care surgeons. Other concerns regarding workforce that are still open to debate—although they are not considered by many to be a practical remedy and are considered by some to be a potential enemy to the brand—are the questions: Should grandfathering (or grandmothering) be considered for those surgeons who have been established in Acute Care Surgery? And if so, what should be the process and criteria? The final aspect of workforce demands that should be self-evident but does not always receive the expected uniform emphasis is the need to expand the critical care workforce. Among the growing number of specialties reporting shortages, the healthcare provider with critical care expertise is considered our greatest specialty shortage in healthcare. This problem is even more

dire if we consider the suboptimal presence of surgeons involved in intensive care units. As elucidated by Ivy et al. (2000), there is a definite advantage of having a surgeon provide specific insights and perspectives to the care of surgical patients. Critical care must continue to be an integral component of Acute Care Surgery.

Table 20.3 outlines the essentials that are needed for the Acute Care Surgery specialty to continue to evolve. These essentials include requisite outcome research, the establishment of a national database/registry for research, credible branding, adoption of a process for formal recognition of the specialty (perhaps ACGME-approved programs or ABMS board certification), and ongoing specialty expansion and growth (incorporating workforce needs and compensation models). Table 20.4 outlines the perceived impediments to this process.

The additional steps that need to be taken in order for the Acute Care Surgery specialty to meet its full potential are outlined in Table 20.5.

There is general consensus that three areas currently require resolution: (1) scope of practice, (2) pursuit of board certification, and (3) formal affiliation with an

Table 20.3 The requisite essentials for the continued evolution of Acute Care Surgery

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|---|
| What are the essentials? |
| 1. The requisite <i>outcome research</i> to demonstrate the substantive benefits of the specialty |
| 2. The establishment of a <i>national database/registry</i> for research |
| 3. Credible <i>branding</i> (this will occur if nos. 1 and 2 are adequately addressed) |
| 4. The creation or adoption of a process for formal recognition, perhaps ABMS board certification, has pros and cons (ACGME—overly stringent duty hour requirements and billing restrictions) |
| 5. Ongoing <i>expansion and growth</i> (including addressing workforce needs and compensation models) |

ABMS American Board of Medical Specialties, ACGME Accreditation Council for Graduate Medical Education

Table 20.4 Acute Care Surgery: perceived impediments

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| 1. <i>No board certification status</i> for Acute Care Surgery |
| 2. <i>No added value</i> from doing an Acute Care Surgery fellowship. (With respect to employment opportunities, is there a meaningful difference between completing a 1-year critical care/trauma training vs. a 2-year critical care/trauma training vs. an acute care fellowship training?) |
| 3. <i>No perceived “public or market” added value</i> in differentiating between an acute care surgeon and a “surgical hospitalist” |
| 4. <i>Reluctance of a few premier trauma/critical care programs to adopt the Acute Care Surgery fellowship model</i> because of the specific curriculum requirements |
| 5. <i>No nationwide compensation standardization</i> for acute care surgeons |
| 6. <i>No widely accepted “bridge training”</i> for some trauma surgeons who need to expand their skill set to include laparoscopic intervention in the emergency setting |
| 7. <i>No apparent coordinated effort</i> between the three major organizations (AAST, EAST, WTA) to address the above and other related issues |

AAST American Association for the Surgery of Trauma, EAST Eastern Association for the Surgery of Trauma, WTA Western Trauma Association

Table 20.5 Next steps needed for Acute Care Surgery to meet its full potential

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| What are the additional steps to be taken? |
| 1. <i>Demonstrate that acute care surgeons improve patient care</i> with proven favorable outcomes |
| 2. <i>Document that the care provided by acute care surgeons</i> leads to improved quality of life |
| 3. <i>Develop scoring scales</i> for acute surgical diseases |
| 4. <i>Educate and train both students and residents</i> in the principles and management of acute care surgery |
| 5. <i>Establish a public image and validate the Acute Care Surgery specialty</i> by elucidating the importance of the acute care surgeon in caring for injured and acutely ill surgical patients, which will increase the public awareness |
| 6. <i>Adopt a formal board certification process for Acute Care Surgery.</i> This would add board certification in trauma to the already established board certification in general surgery and surgical critical care |
| 7. <i>Advocate for the adoption of Acute Care Surgery</i> as a distinct specialty by the international community |
| 8. <i>Pursue governmental and other extramural funding</i> for specific research initiatives |

accrediting body. Scope of practice needs to reflect what is actually being done in the “best practices.” Considering the current representation of distribution of emergency general surgery operative cases, “complex emergency general surgery” needs to be more distinctly defined. There is also a growing consensus that “official” board certification (American Board of Medical Specialties) for the Acute Care Surgery specialty should be pursued. If such an option is not a possibility in the immediate future because of timing and associated political issues, we have to ask whether the post-fellowship examination should be the certifying (or qualifying) examination.

An intriguing alternative approach advocated by past President Wayne Meredith is the establishment of board certification in trauma, which would complete the tri-fecta (certifications in general surgery and critical care are already established). The discipline of trauma is the core component of Acute Care Surgery and an area that the typical general surgeon would likely concede without any substantial opposition. Such an approach would be prudent and likely attractive not only to the surgery community but also to the hospital employer.

While there is a consensus that we should consider the training paradigm for Acute Care Surgery to be under the auspices of the Accreditation Council of Graduate Medical Education (ACGME), this is neither a practical nor a cost-effective option. The duty-hour limitations would be counterproductive and would prohibit Acute Care Surgery fellows from ultimately serving in the role as a junior attending, thus eliminating the valuable educational opportunity of acting as junior faculty. In addition, other ACGME restrictions would prevent fellows from billing for their services, which could severely threaten fellowship funding for many of the current programs.

Controversy still remains on several issues (Table 20.6), including how regionalization of care should be organized, whether an emergency surgery course should be formulated to help promote improved patient care by non-Acute Care Surgery

Table 20.6 Acute Care Surgery: controversy

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1. *Should there be a role for stabilizing the critically ill surgical patient prior to referral to a tertiary center for more definitive care?*
 2. *Should there be regionalization of care, with the creation of an organized system similar to that for trauma to provide appropriate care for high-acuity and complex patient populations?*
 3. *Should an Emergency Surgery course (similar to ATOM or IATSI's "Definitive Surgery Trauma Course") be formulated to help train fellows and promote improved patient care by non-Acute Care Surgery fellowship-trained surgeons in rural areas?*
 4. *Should support be requested from either the AAST or the American College of Surgeons for the training of Acute Care Surgery fellows in REBOA, ASSET, ATOM, and advanced ultrasound techniques?*
-

AAST American Association for the Surgery of Trauma, ASSET Advance Surgical Skills for Exposure in Trauma, ATOM Advanced Trauma Operative Management, IATSCI International Association for Trauma Surgery and Intensive Care, REBOA Resuscitative Endovascular Balloon Occlusion of the Aorta

fellowship-trained surgeons in rural settings, and whether the oversight organizations (e.g., American Association for the Surgery of Trauma [AAST] and Acute Care Surgery) should provide support for focused training in Resuscitative Endovascular Balloon Occlusion of the Aorta (REBOA), Advance Surgical Skills for Exposure in Trauma (ASSET), Advanced Trauma Operative Management (ATOM), etc.

As Acute Care Surgery continues to mature as a specialty, the necessary adjuncts will include the establishment of a web-based system; the possible development of a third-year option that would be devoted to conducting supervised research or working on an advanced degree (i.e., MPH, MA, MBA) or both; the designation of centers for appropriate levels of care; and other possible initiatives. If a postscript is to be written on Acute Care Surgery, it would include a call for the standardization of the fellowships (particularly with respect to the training curriculum), along with standardization of the specialty with respect to the complexity of surgical procedures and the establishment of centers of excellence that deliver optimal healthcare, with verification requirements from the American College of Surgeons.

Certain specific strategic initiatives that the American College of Surgeons should consider include generating a "call to action" similar to the *Injury in America* report by the Institute of Medicine (which documented the gaps existing in emergency care; Institute of Medicine and National Research Council Committee on Trauma Research, 1985) and broadening support for Acute Care Surgery among US surgical leaders, other specialties, and organizations/stakeholders. Acute Care Surgery must be viewed as a critical and essential service across all specialties, and assistance must be provided in the development of an enhanced relative value unit (RVU) system (Center for Medicare & Medicaid Services, CMS) for Acute Care Surgery.

As Acute Care Surgery continues to evolve as a new specialty, "best practices" will emerge that are based on its impact and improved patient outcomes; these outcomes will be the ultimate proof that Acute Care Surgery is the healthcare specialty that provides the best treatment for this cohort of patients.

Just as trauma was depicted by the National Research Council of the National Academy of Science in 1966 as “the neglected disease of modern society,” Acute Care Surgery is the neglected disease syndrome of modern society. Acute Care Surgery needs to ensure expeditious and optimal management of injured and non-trauma critically ill surgical patients. Every discipline has a myriad of ever-changing challenges and threats. At no time, however, should there be challenges or threats that affect the specialty’s missions and, especially, optimal care of the patient. Dr. Martin Luther King Jr. stated that “the arc of the moral universe is long, but it bends towards justice” (King, 1958). What Dr. King did not say explicitly is that the arc does not bend by itself. Such bending requires commitment, effort, and sacrifice. Adapting this statement to healthcare, I strongly believe that the arc of healthcare is long, but it bends toward optimal care and inclusion. It, too, does not bend on its own. Making this arc bend also requires commitment, effort, and sacrifice. Establishing Acute Care Surgery as a defined specialty is part of this bending process, which is necessary to achieve optimal care and inclusion for those surgical patients who are injured and critically ill.

Clinical Pearls

- There can never be quality of clinical care without access to care.
- A patient presenting with a trauma-induced abdominal generalized peritonitis does *not* need a mandatory CT scan of the abdomen.
- Laparoscopy is contraindicated in the patient who is in profound shock and needs a celiotomy.

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Chapter 21

Trauma Care for Justice-Involved Persons



Mary K. Bryant, Sara Scarlet, and Elizabeth B. Dreesen

Case

A 58-year-old man arrives at a trauma center two hours after sustaining multiple self-inflicted stab wounds to the left arm. He is incarcerated at a nearby state prison. He is brought to the trauma bay by emergency medical services personnel and two armed corrections officers. Wrist and ankle shackles are in place. Despite receiving 2 L of IV crystalloid en route, he is tachycardic and hypotensive. He is alert and oriented but appears anxious. No pain medications were given prior to presentation, and he repeatedly cries out in pain. With some difficulty, because of the shackles, additional large-bore IVs are inserted in his right arm. A blood transfusion is initiated. He receives fentanyl for pain. The examination shows a large laceration along the medial portion of the upper arm, with active hemorrhage and exposed fat and muscle tissue in the wound bed. Direct compression is applied. The distal left arm is mottled and cool and has delayed capillary refill. The radial and ulnar arteries are not palpable nor is a signal detected with Doppler ultrasound. The team determines he will require immediate surgery for wound exploration, debridement, arterial repair, and possible fasciotomy.

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As the team begins making preparations for the operating room, the trauma attending attempts to obtain informed consent. She tells the patient that without immediate surgery, he is likely to lose his arm. He asks the attending to please notify his sister and gives the attending his sister's phone number. The corrections officer at the bedside states that, for security reasons, prison policy prohibits direct contact with family members, though the attending may contact the warden, who can speak with the family. The patient tells the team that he will not agree to an operation until his sister is notified. The trauma team knows that any delays in therapy may diminish or prevent limb salvage, and previous experiences with contacting the prison warden for different patients have taken many hours. How should the team proceed?

Introduction

The USA incarcerates more of its citizens than any other country. In 2018, 2.3 million people were incarcerated in the USA (Wagner & Sawyer, 2018), which incarcerates 655 persons per 100,000 individuals—the highest rate in the world (Institute for Criminal Policy Research, 2019). In 2001, the term “mass incarceration” was created to describe a “pathologic state” of incarceration in the USA (Wildeman & Wang, 2017).

The population affected by the criminal justice system far exceeds those currently incarcerated in US jails and prisons. In fact, “justice-involved” persons include individuals who are (1) subject to arrest warrants, pretrial detention, or bail; (2) incarcerated after conviction at local, state, or federal correctional facilities; or (3) under community supervision in lieu of or after incarceration (i.e., parole, probation). Altogether, the number of individuals under some form of correctional control in America is over six million, i.e., approximately 2% of the population, with Americans of color being overrepresented in this population compared with their white American counterparts (Wagner & Sawyer, 2018).

The health of this large population of justice-involved persons differs from that of the rest of the population. National data demonstrate that infectious and chronic diseases, including hepatitis, HIV, diabetes, and hypertension, are more prevalent among incarcerated persons, as are mental illness and substance use disorders (Wildeman & Wang, 2017). Trauma and traumatic injury also play a significant, though less well-studied part in the health of justice-involved individuals, acting as risk factors for disability, mental illness, and future incarceration.

Compared with data on infectious and chronic diseases, there are far fewer data on the burden of trauma among justice-involved persons. In this chapter, we will use the available data to describe the impact of trauma and violence on the health and healthcare of these individuals. We will then make recommendations, based on both data and our own experience, directed at delivering patient-centered trauma care tailored to the unique needs of this group.

Trauma Exposure Before Incarceration

The relationship between trauma exposure and subsequent incarceration has been the subject of significant research. The Centers for Disease Control and Prevention and Kaiser Permanente created the Adverse Childhood Experience (ACE) Questionnaire, which has subsequently been used to assess the effect of multiple types of trauma during childhood. ACEs have been associated with many negative outcomes in adulthood, including physical and mental illnesses, substance use disorders, and violent behavior (Centers for Disease Control and Prevention, 2016). Important for this review is that individuals convicted of violent crimes were four times more likely to self-report ACEs than a sample of unconvicted people (Reavis, Looman, Franco, & Rojas, 2013).

The National Survey of American Life (NSAL) was designed to assess mental health diagnoses and impairments in a nationally representative sample of blacks and non-Hispanic whites, and it included data on both self-reported traumatic experiences and lifetime risk of incarceration (Jaggi, Mezuk, Watkins, & Jackson, 2016). Using data from the NSAL, Jaggi et al. (2016) reported that individuals who experienced four or more traumatic events had fivefold higher odds of incarceration than people with no history of trauma. They also noted that African American children were twice as likely to be injured by trauma than white children (Jaggi et al., 2016).

On the basis of ACE and NSAL data, investigators have proposed multiple mediators of the connection between trauma and the risk of incarceration, including the development of substance abuse (ACEs), post-traumatic stress disorder (PTSD) (NSAL), and traumatic brain injury (TBI) (NSAL). Epidemiologic research on incarcerated persons supports these hypotheses.

A meta-analysis of 33 studies examining TBI among incarcerated people in the USA, Australia, Canada, New Zealand, Spain, and the UK showed an overall incidence of 46% (Durand et al., 2017). The majority of these studies were conducted in the USA (67%). The most common etiologies of TBI were interpersonal violence and motor vehicle collisions (Durand et al., 2017). Notably, among persons incarcerated in the USA, the prevalence of TBI from interpersonal violence was nearly four times that observed in the general US population (37% versus 10%, respectively) (Durand et al., 2017).

A systematic review by Fazel, Yoon, and Hayes (2017) showed a higher rate of substance use disorders in incarcerated persons, with nearly a quarter of newly incarcerated people reporting an alcohol use disorder. There was a similar prevalence of drug use disorders in men and even higher rates in women (Fazel et al., 2017). In a study of low-income African American men, substance abuse was more prevalent among victims of violent injury and was associated with prior incarceration (Richardson, St Vil, Sharpe, Wagner, & Cooper, 2016).

In a systemic review of 36 studies of PTSD in a pooled population of 21,099 incarcerated people from 20 countries, the pooled point prevalence of PTSD was 6.2% for men and 21.1% for women (Baranyi, Cassidy, Fazel, Priebe, & Mundt,

2018). PTSD occurs in tandem with other psychiatric illnesses, including substance use disorders. Incarcerated persons with these mental illnesses may commit behavioral infractions, leading them to serve sentences three to four times longer than those without mental illnesses (Weinstein et al., 2000). Additionally, the combination of prior trauma exposure, PTSD, and justice involvement increases the likelihood of experiencing future trauma, including trauma in custody (Jaggi et al., 2016).

This connection between mental illness and trauma in custody has most recently been highlighted as researchers study the risk factors for arrest-related deaths. Saleh, Appelbaum, Liu, Scott Stroup, and Wall (2018) examined 1099 identified deaths during interactions with law enforcement during 2015. They report that 23% of the individuals displayed signs of mental illness (Saleh et al., 2018). Race (African American vs non-Hispanic white) was also a strong risk factor for death, although mental illness was the most significant risk, consistent with the close relationship between pre-existing mental illness, arrest and subsequent incarceration (Saleh et al., 2018).

In summary, the data highlighted above demonstrate that many incarcerated people experience some form of trauma before incarceration and that these experiences appear to be associated with the lifetime risk of incarceration. We will demonstrate that the mental and physical sequelae of previous trauma not only predispose individuals to arrest and incarceration, but they may additionally account for an increased risk of future traumatic injury during and after incarceration.

Trauma Associated with Incarceration

Life in correctional facilities carries the risk of traumatic injury and death. Occupational injury can occur in prison industries and worksites, for example. Other unintentional injuries include sports injuries, falls, and motor vehicle collisions associated with travel to court and medical facilities. Intentional injury, including sexual assault, is a source of fear and anxiety. The high prevalence of mental illness confers an increased risk of suicide and self-harm. There is a relative paucity of data on traumatic injury in incarcerated persons, but the available data suggest that a large number of incarcerated people experience traumatic injuries, which vary significantly in type and severity.

The Bureau of Justice Statistics (BJS) periodically surveys people incarcerated in both state and federal prisons, as well as in jails. These are distinct populations and are surveyed separately because jails typically hold persons who are awaiting trial or who are serving shorter sentences. In fact, nearly three-quarters of the jailed population have not yet been convicted of crimes (Wagner & Sawyer, 2018). The prison population of persons convicted of crimes is a more stable group who are serving longer sentences. On any given day, one-third of the incarcerated population in the USA is in jail and not prison (Wagner & Sawyer, 2018). The large turnover associated with post-arrest and pre-trial detention is demonstrated by the 10.6 million jail admissions in the USA each year (Wagner & Sawyer, 2018).

In the most recent BJS Survey of Inmates in State and Federal Correctional Facilities (performed in 2004), 32% of people incarcerated in state prisons reported that they had sustained an injury since entering state prison (Maruschak, 2008). Persons in federal prison reported a lower rate of 28% (Maruschak, 2008). In both settings, accidental injury was more likely than intentional injury: In state prison, accidental injury rates were 1.5 times higher than intentional injury rates; and in federal prison, they were 2.5 times higher (Maruschak, 2008). In both settings, incarcerated men were more likely to be injured than women (Maruschak, 2008).

In a deeper examination of this 2004 BJS Survey, Sung (2010) examined types of and risk factors for injury among people incarcerated in state prisons. Sung noted that about three-quarters of the reported injuries were relatively minor, involving bruises, sprains, cuts, scratches, and swelling. Internal injuries and loss of consciousness were present in less than 10% of both intentional and accidental injuries, and knife and gunshot wounds accounted for 15% of injuries in fights and assaults (Sung, 2010).

In Sung's analysis, a pre-incarceration history of physical abuse increased the risk of violent injury, and a previous history of a gunshot or stab wound increased the risk of both violent and accidental injury (Sung, 2010). Mental illness, including mood or anxiety disorders and substance dependence, significantly increased the risk of both types of injury (Sung, 2010). Not surprisingly, having a disability requiring a physical aid in daily activities increased the risk of both violent and accidental injury. Persons incarcerated for violent offenses had an increased risk of both types of injury, whereas drug offenders had a lower risk for both types. Maintaining telephone contact with family and friends was associated with a lower risk of violent injury, and having work assignments on prison grounds decreased the risk of violent injury but increased the risk of accidental injury (Sung, 2010).

In the 2004 BJS Survey of Inmates in State and Federal Correctional Facilities mentioned above, people in jail reported fewer injuries than those in prison, and only 13% reported being injured since being incarcerated (Maruschak, 2006). This may simply be a result of the shorter time spent in jail and thus a lower exposure to the possibility of injury. Additionally, because most persons in jail are not convicted, they are not required to complete penal labor and thus are unlikely to sustain an occupational injury.

Unlike state and federal prisoners, jail inmates were as likely to be injured in a fight or assault as they were to be unintentionally injured (Maruschak, 2006). Men and women reported approximately the same rate of injury from accidents, although men were more likely than women to be injured in fights (7% and 4% of reported injuries, respectively) (Maruschak, 2006). Risk factors for experiencing intentional injury in jail mirrored those for state and federal prisoners and included incarceration for violent crimes and the presence of any of six self-identified impairments (i.e., learning, speech, hearing, vision, mobility, or mental impairment) (Maruschak, 2006).

More recent evaluations of more limited populations add detail to the findings above. Ludwig, Cohen, Parsons, and Venters (2012) reviewed all injury reports from New York City jails (average daily census: 13,000) for 4 months in 2010. Most injuries were relatively minor, with 62% of them involving only skin, soft tissue, and muscle; however, the majority (66%) were deemed intentional (Ludwig et al., 2012). Interestingly, despite the fact that the majority of the injuries were minor, 39% exceeded the capacity of the jail medical staff to treat them and required transfer to jail urgent care or local emergency rooms. In evaluating the total number of transfers from New York City jails to urgent or emergent care, investigators noted that 40% of the transfers were for traumatic injury (Ludwig et al., 2012).

Additional recent studies have looked more closely at the population of incarcerated people who present to emergency rooms. Koester, Brenner, Goulette, Wojcik, and Grant (2017) reviewed Department of Corrections patients who presented to the emergency room at SUNY Upstate Medical University in Syracuse, NY. Traumatic injury was the single most common complaint, leading to 16.8% of visits; abdominal pain and chest pain were the second and third leading complaints (13.5% and 9.0%, respectively); and self-injury was the next most common complaint (8.7%). Thus, injury (unintentional and intentional, including self-injury) was responsible for one-quarter of visits, although the severity of the injuries and need for admission are not reported (Koester et al., 2017). Facial trauma represented 33% of the injury-related visits. This study confirmed the findings of Henning, Frangos, Simon, Pachter, and Bholat (2015), who evaluated injured patients transferred to Bellevue Hospital from the New York City Department of Corrections short-term holding facility. In this study, the most common injuries were mandible and facial fractures, and the most common mechanism of injury was assault with a fist (Henning et al., 2015).

Several specific types of injury are of significant concern in the incarcerated population, although they are not described in the above retrospective studies. These include sexual assault, foreign body ingestion, and other forms of self-injury.

Sexual Assault

In 1992, it was estimated that up to 20% of people incarcerated in prisons had experienced sexual assault (Peek, 2004). This prompted the Prison Rape Elimination Act (PREA) of 2003, which was passed with overwhelming bipartisan support in Congress (Rantala, 2018). Under PREA, national standards were developed to prevent incidents of sexual violence in prison. These standards took effect in 2012 and include annual reporting. Since the publication of the national standards, allegations of sexual victimization have skyrocketed, yet the Bureau of Justice Statistics reports that substantiation of these claims remains under 10% (Rantala, 2018). For example, in 2015 there were 24,661 allegations of sexual victimization in adult correctional facilities, but only 1473 (6%) of these were substantiated (Rantala, 2018). The majority of these substantiated incidents (58%) were perpetrated by other incarcerated people (Rantala, 2018).

Self-Harm

Self-injury manifests in a variety of forms, including insertion of foreign objects into orifices, ingestion of substances or foreign bodies, or cutting. As many as 48% of incarcerated people report self-injurious behavior compared with 4% of the general population (Dixon-Gordon, Harrison, & Roesch, 2012). The data of Ludwig and others from the New York City jail system suggests much lower rates than this, however, with self-injury constituting 8% of identified injuries in the report from Ludwig et al. and occurring in 0.05% of almost 245,000 jail incarcerations from 2010 to 2013 (Kaba et al., 2014; Ludwig et al., 2012).

Although self-injurious behaviors may be related to mental illness, including psychotic disorders and borderline personality disorder, they may also be attempts to express anger and hostility, to nonverbally express internal emotional pain, and to avoid more serious, self-destructive impulses (Fagan, Cox, Helfand, & Aufderheide, 2010). Self-injury may represent an attempt to remove oneself from a prison or jail by seeking medical attention (Walsh, 2012). Although these forms of self-injury do not represent suicide attempts, they are nonetheless a risk factor for suicide with as great as a 15–30-fold increase in risk of suicide among persons who self-injure (Fagan et al., 2010).

Foreign body ingestion can be a method of self-harm for incarcerated persons. While most ingested objects will pass spontaneously without injury, invasive procedures, including endoscopy or surgery, may be required. In our practice, surgical wounds themselves have been used to further self-injury. Dehiscence and evisceration have occurred as incarcerated patients force a foreign body through a surgical wound.

Recidivism is high among incarcerated persons who self-harm. The majority of correctional facilities report at least one occurrence of self-injury weekly (Walsh, 2012). Additionally, some studies suggest that an incarcerated person is more likely to self-harm for the first time if they witness self-harm in other incarcerated individuals (Hawton, Linsell, Adeniji, Sariaslan, & Fazel, 2014). In addition to mental illness, solitary confinement is a risk factor for self-injury. Sadly, in circumstances with limited mental health treatment, solitary confinement may be used as a substitute for treatment after an act of self-harm, despite the fact that solitary confinement itself is associated with increased acts of self-harm (Kaba et al., 2014).

Death Associated with Incarceration

The differences between prison and jail populations are reflected in the deaths that occur in those incarcerated in these different facilities. Data on this topic are reported in the BJS report *Mortality in Local Jails and State Prisons 2000–2013* (Noonan, Rohloff, & Ginder, 2015).

In jails, suicide is the leading cause of mortality, with an incidence eight times higher than in the general population (Fazel, Cartwright, Norman-Nott, & Hawton, 2008). In the BJS mortality report cited above, from 2000 to 2013, 30% of all jail deaths were attributed to suicide, whereas only 6% of all prison deaths were suicides (Fazel et al., 2008). High suicide rates in jail are attributed to persistent intoxication,

withdrawal, and acute stress upon incarceration in the jail setting immediately after arrest. In contrast to jail deaths, 89% of deaths in prison during this reporting period were attributed to illness, with heart disease being the leading cause of illness-related death (Fazel et al., 2008).

In both settings, traumatic deaths were less frequent than suicides or death from illness (Fazel et al., 2008). The BJS report found that homicide and accidents were the cause of 5% of jail deaths and 3% of prison deaths (Fazel et al., 2008). These are relatively low numbers when compared with the rates of injury in either of these settings and support the above data about the predominance of minor trauma in the reported injury statistics.

Trauma After Incarceration

Multiple international studies on health outcomes after incarceration have revealed a marked elevation in mortality when formerly incarcerated persons are compared with people without a history of incarceration. Since 2007, three large retrospective cohort studies have examined the risk of death among incarcerated people released from state prisons in Washington (WA), North Carolina (NC), and Georgia (GA) (Binswanger, Blatchford, Mueller, & Stern, 2013; Lize et al., 2015; Rosen, Schoenbach, & Wohl, 2008; Spaulding et al., 2011). The two largest studies (in NC and WA) identified all persons released from state prisons during the study period (from 1980 to 2005 in NC; from 1999 to 2009 in WA), then linked these data to state and national death registries (Binswanger et al., 2013; Lize et al., 2015; Rosen et al., 2008). Expected mortality for non-incarcerated persons was determined from state vital statistics (Binswanger et al., 2013; Lize et al., 2015; Rosen et al., 2008).

The most dramatic findings are from WA, where previously incarcerated persons had a standardized mortality rate (SMR) 3.61 times higher than non-incarcerated matched counterparts (Binswanger et al., 2013). Similarly, people who were incarcerated in GA on June 30, 1991, and were subsequently released had an elevated SMR (1.54) (Spaulding et al., 2011). Although previously incarcerated African Americans had a higher mortality rate than whites, the SMR for previously incarcerated persons in NC was 2.08 for whites and 1.03 for African Americans (Lize et al., 2015; Rosen et al., 2008). This racial disparity was also present in WA and GA (Binswanger et al., 2013; Spaulding et al., 2011). There is no clear consensus on why previous incarceration seems to confer a higher risk of mortality on white people than on African Americans.

Interesting differences in causes of death arise in these large state studies. In Washington, one-quarter of the deaths were from drug overdose, which was the leading cause of death in the previously incarcerated population (Binswanger et al., 2013). The risk of overdose death was particularly high in the week immediately after release, occurring at a rate 127 times that in the general population (Binswanger et al., 2013). Homicide, suicide, and motor vehicle collisions were also among the top six causes of death in Washington (Binswanger et al., 2013). The mortality from

overdose was also higher among previously incarcerated persons than in the general populations of North Carolina and Georgia, but injuries and violence were more likely causes of death in those states than drug overdose (Binswanger et al., 2013). In North Carolina, 25% of previously incarcerated persons died from injury, including homicide, motor vehicle collisions, and other unintentional injuries, while only 4.7% died from overdose (Rosen et al., 2008). Similarly, in Georgia, death from homicide and transportation-related injuries occurred at four times the rate of death from overdose (Spaulding et al., 2011). These differences between states undoubtedly reflect both differences in state prison and release policies and the contribution of factors such as the opioid epidemic and AIDS during the various study periods.

The number of people released from jail each year dwarfs the number of people released from state and federal prisons; however, less literature is available on the former group's health outcomes. In the largest study of people released from jail, Lim et al. (2012) evaluated 155,272 people who spent at least one night in a New York City jail from 2001 through 2005. Only deaths from suicide, homicide, and drug overdose were evaluated, and deaths as a result of non-homicidal injury were excluded (Lim et al., 2012). Neighborhood-specific rates of death were matched on the basis of age, race, and gender to allow SMRs to be calculated (Lim et al., 2012). Among the previously incarcerated, the SMR of death from overdose was 2.2 and of death from homicide, 1.7 (Lim et al., 2012). Racial differences were noted: non-Hispanic whites had a high risk of suicide (SMR 2.6) and drug-related death (SMR 5.2), whereas non-Hispanic blacks (SMR 1.7) and Hispanics (SMR 2.1) had a higher risk of homicide (Lim et al., 2012).

Deaths from homicide and unintentional injuries point to the existence of a larger population of previously incarcerated persons who experience less severe consequences of trauma. In the USA, however, it is difficult to assess the burden of injury in the post-incarceration period because incarceration or previous incarceration is not a required data point in the National Trauma Data Bank. In fact, the only study to evaluate injury-related admissions in formerly incarcerated Americans examined a Medicare population of 110,419 previously incarcerated persons who were released between 2002 and 2010 (Wang, Wang, & Krumholz, 2013). In this study, Wang et al. analyzed rates of hospitalization within 90 days of release. They found that admission for injury occurred in 0.18% of Medicare beneficiaries with a history of recent release and in 0.07% of control beneficiaries not previously incarcerated and matched for age, sex, race, zip code, and qualification for Medicare. The types of injuries were not specified (Wang et al., 2013).

Studies of both jail and prison populations identify risk factors for death and injury, including the demographic characteristics mentioned above. Additionally, women are consistently found to have a higher risk of mortality from overdose than men (Binswanger et al., 2013). Shorter sentences are associated with higher risk of subsequent drug overdose deaths (Binswanger et al., 2013). Release from prison without community supervision is also cited as a risk factor for death, hospital admission, and injury, as is release to homeless shelters (Binswanger et al., 2013; Wang et al., 2013). Comorbidities, including previous substance use, mental illness, and dual diagnosis, also predict injury and death (Binswanger et al., 2013).

Conclusion

Just as the prevalence of correctional control in the USA is high, so too is the prevalence of trauma among the “justice-involved” persons (i.e., those in police custody, incarcerated, or on probation or parole). Early experiences of trauma predispose individuals to justice involvement later in life, and TBI, PTSD, and substance abuse are among the known risk factors for later justice involvement. Events resulting in justice involvement may also result in traumatic injuries, as Black Lives Matter activists have emphasized. Acutely, arrest and being sent to jail drive elevated rates of suicide. Longer prison incarcerations are associated with high rates of injury. The high prevalence of traumatic events continues even after release, and the likelihood of traumatic death after release from a correctional facility is alarming.

Nearly all clinicians who provide trauma care will care for people who are or have been justice-involved. Sometimes, justice involvement is obvious, e.g., through the presence of shackles or law enforcement. A history of justice involvement may be more subtle, but both current and previous justice involvement are associated with experiences, comorbidities, and future risks that influence people’s health and healthcare.

As we highlighted in our case at the start of this chapter, justice-involved patients can challenge our ability to provide high-quality trauma care. The presence of law enforcement officials, for example, can disrupt the privacy of the doctor-patient relationship. Shackles and other physical restraints may limit standard practices, such as encouraging ambulation. Restrictions on direct communication with families, friends, and other potential surrogates may deprive the incarcerated patient of advocacy and support during their illness. All of these considerations require careful consideration by healthcare providers.

Clinicians who provide trauma care have identified special populations—pregnant women, children, and geriatric patients—who require trauma care that is tailored to their unique physiologic characteristics. We believe that the data we have presented here demonstrate that justice-involved persons are also a special population, with common comorbidities and risk factors for specific injuries that must be recognized in order to ensure the provision of high-quality trauma care. Additionally, quality care for justice-involved persons will require tailoring injury prevention, education, rehabilitation, and performance improvement to their complex social milieu.

Recommendations and Future Directions

Understanding the burden of disease influences the resources and preventive strategies offered by trauma centers. Unfortunately, there are no comprehensive data on injuries and outcomes for the injured incarcerated population. Therefore, there are insufficient data to develop practice-based guidelines for delivering trauma care to justice-involved patients. Nevertheless, given our own experiences and the available evidence, we offer the following recommendations to guide current clinical care and future practice development:

- Current or previous justice-involvement—not the type of crimes an individual has been accused or convicted of—should be elicited as part of the social history.
- Education related to trauma must consider the prevalence of TBI, cognitive impairment, and mental illness among justice-involved individuals.
- Substance use screening and counseling should be pursued for all individuals, even those under correctional control.
- All injuries should be assessed for possible self-harm, and, if appropriate, psychiatric evaluation and treatment should be pursued.
- Safe discharge planning must include care managers familiar with correctional institution capabilities.
- Education related to trauma must consider the prevalence of TBI, cognitive impairment, and mental illness among justice-involved individuals.
- Active collaboration on care between trauma centers and correctional systems should be developed, focusing on trauma prevention, risk assessment, early identification of injury, and post-trauma care, as well as on the collection of robust data on injuries and outcomes.
- The National Trauma Data Bank and Trauma Quality Improvement Program should include justice involvement and/or incarceration data points.

Justice involvement in the USA is associated with significant health disparities, some of which pertain to the burden of traumatic events and injuries. We believe it is our ethical obligation to advocate for national best practices for the justice-involved population. Only then will we achieve health equity in trauma care.

Clinical Pearls

- At 2.3 million, the incarcerated population in the USA is the largest in the world. This number represents a fraction of the total “justice-involved” population, which comprises over six million people, or 2% of the US population.
- Trauma is a risk factor for future justice involvement. Many justice-involved individuals experience or witness trauma prior to periods of justice involvement.
- Periods of incarceration are characterized by an increased risk of violent injury, self-harm, and unintentional injuries. The prevalence of these forms of trauma varies significantly between different types of correctional facilities. Mental health and substance use disorders are also associated with an increased risk of injury while incarcerated.
- Risk of injury and death is increased in the period after release from a correctional facility. Among the recently released, overdose is the major cause of death.
- No widespread data exist on the incidence, mechanisms, and outcome of traumatic injury for justice-involved persons. Robust data on injury and outcomes, advocacy, and relationships between trauma systems and the criminal justice system are necessary for the delivery of high-quality trauma care.

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